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EDITORIAL NOTES.

The Meeting of the Gaslight and Coke Company.

THE meeting of the Gaslight and Coke Company was not by any means largely attended; but the interest of the proceedings did not suffer on that account, for the speakers were of the first order among the proprietary, and the subjects discussed on both sides of the table of cardinal importance. The Governor, Colonel W. T. Makins, spoke with studied care; and what he said and did not say, taken together, constituted a great endeavour to rise to the needs of the situation. It is impossible to hold that the effort was altogether successful. The Governor has many qualifications for his high position; and as a Chairman he is very adroit and plausible. But he has the weakness of disliking criticism. All persons who do not subscribe fully to the doctrine of the infallibility of the Horseferry Road Administration, according to him, are either ill-mannered or uninformed. It is very difficult to imagine the kind of critic he would listen to patiently. He held Sir James Rankin's to be an incompetent Committee of the House of Commons, and is shocked when the Chairman of another Gas Company says unkind things of the Chartered Administration. It must have occurred to many of Colonel Makins's audience on Friday that the best way to meet criticism is to defy it, by rising superior to fault-finding.

It is to be regretted that the Governor did not make good the claim of the report to a saving of carbonizing wages, by stating separately the costs of manufacture of coal and carburetted water gas. A very serious condition of things, in the counsels of the Horseferry Road board-room, was revealed in the statement that it will probably be necessary to make up part of the diminished balance on the revenue account of the current half year, due to the reduction in the price of gas—which is admittedly more than the Company can afford in the circumstances—by stopping the expenditure on rehabilitation of plant. Ordinary repairs and maintenance are, of course, to go on; but the undertaking is to be deprived of its supply of life-blood for the prevention of physical depreciation. One wonders what the gas engineers on the Board think of that. The ordinary professional director naturally thinks of the dividend, and is quite happy to live from hand to mouth; but that is not good gas policy. Of course, the Governor claimed again that if the Board have dissipated the resources of the Company, it has been in order to keep down the price of gas. It is the greater pity that they have not succeeded in this laudable attempt; for nobody calls their gas cheap. On the other hand, what they are blamed for is that they have abused the sliding-scale in the sole interest of the highest possible dividend declarations.

The narrative of the abortive Nine Elms negotiations with the South Metropolitan Gas Company was told by the Governor at length—not altogether without reflections on the other side partaking of the quality of those ill-natured comments which are so foreign to the Horseferry Road! This naturally brought up Mr. Livesey, to give his version of the legend, which must now be relegated to the archives of ancient histories, for the subject will henceforward, by mutual consent, be dropped as between the Companies. Mr. Livesey followed up this explanation with a quietly-reasoned indictment of the policy which has brought the undertaking into its actual impecunious position as regards capital. His grave words were very gravely received, and had at least the effect of eliciting from the Governor the pledge that if this year's Bill of the Commercial Gas Company passes, the next Chartered Bill will have to be drawn up on similar lines. After all! Why not have been wise in time, and have agreed with the opposition while Sir James Rankin was "in "the way" with all the interests? Unless the future policy of the Chartered Company is to be a species of "Little "Englandism," which some of the Governor's utterances seemed to favour, his old *non possumus* attitude will have to go. But what have the Company lost by the vain persistency in keeping it up all these years?

Mr. Livesey spoke earnestly in favour of the Company undertaking Welsbach lighting, with "maintenance," as is practised by the South Metropolitan and so many of the most enterprising Companies. He threatened the unhappy Welsbach Company with indulgence in another kind of "maintenance"—the support of their alleged infringers—if the new Welsbach Board persist in the old antagonism to gas companies. It is inconvenient, to say no more, to discuss Welsbach Company politics at a Chartered meeting, so we shall refrain from saying anything more on this than to express the hope that Mr. Livesey's words, supported as they were in essence by Colonel Makins, will be taken by the new administrators of the Welsbach Company as a warning. If the latter wisely use their rights to conserve their trade, and not to wring a fancy price out of the users of mantles, then the gas companies will work with them to a mutual end. The emergency in which gas lighting now finds itself, however, is too grave for enterprising gas companies to rest content with seeing what their advisers regard as a necessary of their life made dear for the benefit of the ironmongers, or to pay a dividend on a recklessly inflated capital. Both the Chartered and Welsbach Companies are suffering from not having been wise in time. It remains to be seen if they can even now be timely wise.

Photometry and Safeguarding Conditions.

PHOTOMETRY has not had a remarkable innings at the meetings of gas technical societies of late years; and therefore the discussion on Dr. Frank Clowes's contribution at the meeting of the Society of Chemical Industry last week is refreshing, although it cannot be said that it adds much to our stock of knowledge on the question. But the report in our "Technical Record" presents several little interesting shoots from the main subject, which, while they need not be specifically mentioned here, will be read with advantage. There is, however, one point to which reference may be made. Among men competent to judge, few will question and most will agree, that the Harcourt ten-candle pentane lamp and the table photometer which have now replaced the old candles and the bar photometer in the London gas-testing stations stand on a higher level of veracity compared with the latter as recorders of the illuminating power of gas. But ever since the advent of this instrument (which engendered a more comfortable feeling among the Gas Companies), there has been a disposition—nay, a pronounced anxiety—on the part of those under the London County Council, whose duty it is to carry out the testing of the gas in accordance with the prescriptions of the Gas Referees, to effect changes in the conditions of the testing—in other words, to knock away those old safeguards of photometrical testing which have given a uniformity of conditions and a degree of confidence. How a disassociation from uniformity would profit anyone, it is difficult to see; but it is not difficult to see that it would have the effect of opening the road to all sorts of disagreement and soreness. The new state would be worse than the first; in other words, all the good that has come from the introduction of the pentane lamp would be negatived. The very people who now admit (what the Gas Companies long since complained of) that the disparity in the old candles did not give results which were above suspicion, are the people who now avow that the coincidence of the conditions under which the tests are made is of no real value. The views of these advocates of disparity were emphasized by Dr. Clowes at the meeting of the Society of Chemical Industry last week. He contemptuously described the arrangements prescribed for ensuring uniformity as "niceties" and "refinements." But it is the observance of these perfecting rules which gives confidence; and any infraction of them would cause no end of discontent. At the meeting, Mr. T. S. Lacey was the only gas engineer present to speak against any violation of the well-recognized conditions; and this reminds us that the new pentane lamp and table photometer have not been properly submitted to

the criticism of a meeting of gas engineers. Dr. Clowes delivered a lecture on them at the meeting of the Gas Institute last year; but, as is the custom, the lecture was not discussed. Many gas engineers have now had experience of the new instrument; and a paper before the Institution of Gas Engineers, the Gas Institute, or the Southern District Association of Gas Managers would, we believe, bring out the members' observations of its conduct, and their views upon the point of the threatened, or apparently desired, destruction of their time-honoured protective rights.

A Receiver for Debenture Holders not an "Incoming Tenant."

THE judgment delivered in the Chancery Division last Friday by Mr. Justice Swinfen Eady, in the case of *Husey v. Gaslight and Coke Company*, can scarcely be said to decide any new principle of gas law. It really amounted to a refusal to narrow down the decision of the Court of Appeal in the well-known case of *Paterson v. Gaslight and Coke Company* on a technical point. The Paterson case, it will be remembered, settled the question of whether receivers and managers when appointed by the Court to take possession, on behalf of debenture holders of the property, and carry on the business of a limited company, were entitled to demand a supply of gas from the Gas Company without paying the arrears due for gas supplied prior to the receivership. In other words, whether the entering into possession of the receivers constituted a change of occupation within the meaning of section 39 of the Gas-Works Clauses Act, 1871, and of the analogous sections in the Metropolis Gas Act and the Private Acts of the Gaslight and Coke Company.

The judgment then delivered by Lord Justice Lindley was to the effect that these sections do not apply to "persons "simply put in possession of the premises of a defaulting "consumer, to manage his business for the benefit of his "creditors and himself. The statute contemplates and pro- "vides for," said his Lordship, "a change of possession of "a very different nature; and its language is quite inappro- "priate to cover such a case as this. The plaintiffs' rights "as receivers and managers were merely those of custo- "dians of the Mill Company's property. The relation of the "Mill Company to the plaintiffs was not the relation of out- "going and incoming tenant, nor of vendor and purchaser, "but that of owner and caretaker. . . The position of the "plaintiffs towards the Gas Company is precisely similar to "that of the Official Receiver in Smith's case."

This judgment, coupled with that in the Smith case—which decided that the making of a receiving order against a defaulting consumer does not determine his occupancy of his premises, and therefore does not give the Official Receiver the right to a supply of gas without paying the arrears—has been of enormous value to gas undertakings throughout the country; and it is a matter for satisfaction that its force remains unimpaired. The chief arguments upon which the Counsel for the plaintiff in the case of *Husey v. Gaslight and Coke Company* (Husey being the Receiver appointed by the Court to take possession of the property of the Mansions Proprietary, Limited) appeared to rely were two. The one would, if made good, have practically cancelled the Paterson judgment; the other relied upon a difference between the Husey and Paterson cases.

The first argument was that, as the mortgagees, instead of entering into possession of the property, applied to the Court to have a receiver appointed, they were virtually in possession; and were new tenants under the demise in the mortgage deed, holding the premises by a totally new title. His Lordship, however, held that the mortgagees had not entered into occupation under the trust deed, in the case of the hotel portion of the property. In regard to the other property, consisting of flats, he held that not even the receiver was in possession. When it was suggested that the mortgagees were new "owners" of the flats, his Lordship remarked that, whether this were so or not, there was nothing in the Gas Acts entitling an "owner" to a supply of gas without payment of gas arrears due in respect of the property. This is an entirely new point to us; and we should like to hear a considered judgment on the question of whether the words "incoming tenant," in the various sections requiring a gas company to supply the "incoming "tenant," irrespective of arrears due (except in certain circumstances) do or do not include any one who would be entitled under section 11 of the 1871 Act to a supply of gas—that is, any "owner or occupier" of premises. Is not an owner in occupation of his own property the "tenant" of that property in the literal meaning of the word?

The second argument for the plaintiff was this: In the Paterson case, the order of the Court appointing the receivers did not contain any direction whatever for the delivery up of possession of the property of the Company (Marriage, Neave, and Co., Limited) to the receivers, who, taking possession under the mortgage deed, were the agents of the mortgagors. The order appointing Husey receiver of the Mansions Proprietary provided that the Company should deliver over to Husey, as such receiver, possession of their property, "so far as was necessary for the purposes of such "receivership." Inasmuch as, in delivering judgment in the case of *Re Marriage, Neave, and Co., Limited, &c.* (determining whether the appointment of the receivers constituted a change of occupation of the Company's property within the meaning of the Poor Rate Assessment Act, 1869), Lord Justice Lindley said that the omission of any order to deliver up possession of the property to the receivers was, to his mind, "very important," it was contended that the inclusion of such an order in the case of Husey took that case outside the Paterson judgment. His Lordship declined to take this view, pointing out that the order to give up possession was limited by the words "so far as is "necessary for the purposes of the receivership." Moreover, the Marriage-Neave rates case was decided upon different statutes from the gas case; and what was "very "important" in the one case was not necessarily of any importance in the other. His Lordship held that Husey was in no better position to demand a supply of gas than was Paterson, and he dismissed the motion, with costs.

This decision is very satisfactory and obviously just; for, as Lord Justice Lindley remarked in his Paterson judgment, receivers appointed by the Court are appointed for the benefit of the debenture holders, and, having regard to the nature of their security, and to the obligation imposed by statute on the Gas Company to continue to supply gas to the mortgagor, it would be very unjust if the debenture holders could enforce this obligation against the Company without complying with the condition of paying for the gas supplied to the mortgagor while they (the debenture holders) permitted the mortgagor to carry on the business. Shortly, gas undertakings have special rights in consequence of their special obligations.

Mr. Percy Griffith's Society of Engineers Address.

IT is always a source of gratification to us to see the presidential chair of the Society of Engineers occupied by a member of the particular branches of engineering in which readers of the "JOURNAL" are interested; and we congratulate Mr. Percy Griffith on the honour that has been done him by his selection to fill this position during the present year, as well as the Society on the wise choice they have made of a President. There was a very full attendance of expectant members and friends at the opening meeting last week, to hear Mr. Griffith deliver his Inaugural Address; and at its conclusion those present showed by unmistakable signs that they had not been disappointed. Indeed, the address proved to be quite worthy of the Society and of the author. As was to be expected, Mr. Griffith confined himself to the two departments of which he has chiefly had experience—namely, gas and water—and without wasting time on the past, he turned at once to the present and the future. As he very truly argued in his opening remarks, "however "fascinating the study of the past may be, it is more than "ever necessary, in these days of rapid progress, to devote "oneself energetically to those newer problems which arise "with ever-increasing frequency, rather than to follow "slavishly in the steps of those who have gone before." While disclaiming any desire to disparage the value of the work done by their predecessors—a knowledge and full appreciation of which, he admitted, was as necessary now as ever it was—he asserted that the time was now past when any branch of engineering could be learnt from a study of existing works alone.

Seeing that Mr. Griffith dealt only with present practice and future prospects, his references to gas matters were confined to incandescent lighting, and to its natural consequence—the reduction of illuminating power. He remarked that it required no great effort of the imagination to foreshadow the time when 14 and 16 candle gas, at prices varying from 6s. to 2s. 3d. per 1000 cubic feet, will be a thing of the past, and the cost of artificial lighting will be reduced to a mere fraction of what it is at present.

Perhaps not much effort of the imagination may be needed to picture this; but a great deal of real hard work has still to be performed by those having the welfare of the gas industry at heart before such a desirable state of things can become an accomplished fact. A great amount of prejudice with regard to this question exists in many parts of the country; and the uprooting of this will require strong effort, and above all perseverance. No doubt, with the continual extension of incandescent lighting, the lowering of the illuminating power everywhere would in time follow as a matter of course; but we must not be content with this. Rather let us hasten, by every means at disposal, the advent of a cheaper gas supply, with all the blessings that would follow in its train. To this end, Mr. Griffith suggests that some gas authority should secure the necessary powers and undertake the entire displacement of the ordinary jet by incandescent burners, and the supply of low-grade gas throughout their system at proportionately reduced charges. This would be a bold step; but equally bold steps have been taken before, and have succeeded. After urging upon gas authorities who have not already done so the desirability of undertaking the supervision of mantles and burners, and extending the system to the utmost, the author brought this portion of his address to a close with a brief but lucid description of several systems of high-pressure incandescent gas lighting.

Interesting as were Mr. Griffith's remarks on gas, his references to water supply were, if possible, even more so. Before all things a water engineer, it was only to be expected that he would treat this subject with a master-hand. Starting by pointing out the fact that, even now, there are many parts of the country without a proper water supply, he proceeded to consider what he believes to be some of the principal causes of the existing state of things—namely, the system of control, the areas of supply, and the physical features of the country. The conclusion arrived at by Mr. Griffith is that the question of water supply, and more particularly the allocation of the various sources, should not be left in the hands of individuals, but should be treated as a public matter, and adjudicated on by specially created Boards of Control. This matter was, of course, prominently brought forward at the Conference on Water Supply and Rivers Pollution held last October; and our readers are aware of the steps that have been taken in regard to it by the County Councils Association and the British Association of Water-Works Engineers. It should without doubt be one of the first duties of local authorities to furnish water to places not possessing a public supply; but how many more towns and villages would be in this unfortunate position than are to-day, had it not been for the efforts of private individuals, who have sunk vast sums of money—often for many years without any return—in providing with one of the prime necessaries of life communities who were unable or unwilling to do it for themselves? Mr. Griffith admits that in recent years local authorities have begun to realize more fully their responsibilities in regard to such matters; but the greatest credit is due to that private enterprise—too often the subject of unmeasured abuse—which has for so long a period all over the country supplied the public needs in this respect.

Space will not permit of our dealing with the other interesting points brought out by Mr. Griffith in this part of his address; we refer our readers to the full text, which appears elsewhere. In conclusion, it must be admitted the address is a notable addition to the number already in existence, delivered by gas and water engineers for the information of their fellows.

The Course of Trade.

The Board of Trade returns for the first month of the year give no indication of change in the general situation of trade, which may be described as dull. The exports of iron and steel show a 10 per cent. increase in volume compared with a year ago, but a 30 per cent. decrease from the figures for 1900; while the imports continue to increase steadily. In January, 1900, we imported 19,258 tons of iron and steel; in January, 1901, 48,436 tons; and last month, 63,388 tons. Compared with 1900, there was a diminished demand upon our home manufacturers of 152,000 tons, in spite of the very wide difference in prices prevailing then and now. Compared with 1901, the demand, so far—that is to say, as affected by the balance of our foreign trade—was stationary. The home demand for iron and steel shows no signs of expansion, the steady falling off of work in the shipbuilding districts having a decidedly depressing effect in this respect. The exports of coal were practically maintained during last month at the level of 1900; sales amounting to 3,027,160 tons against 3,048,987 tons, while shipments of bunker coal were 1,202,269 against 1,030,165 tons—a net increase of 150,277 tons. The returns during the current half year will be watched with considerable interest for signs of the effects of the coal tax, which is now in full force. It is after the first three months that the reduction is most likely to make itself evident. The prices now being obtained for foreign sales are very much lower than last year; the reduction shown, of 22,000 tons, being accompanied by a fall of £467,000. Nothing in these returns, or in the current reports of the state of the various markets — coal, iron and steel, and engineering—leads us to modify in the slightest degree our views as to the possibility of gas undertakings obtaining their coal requirements this year at a lower price than they are paying under existing, and shortly expiring, contracts. On the contrary, those views are strengthened by both returns and reports.

The Debt of Paris.

In connection with the recent intelligence we have been able to give our readers concerning the proposed resettlement of Paris gas matters, it will be interesting to all those who are connected with the work of local administration in England to take a brief glance at the general financial situation of the French capital. The special correspondent in Paris of the "Pall Mall Gazette" a short time ago sent over a striking statement relating to the finances of what he called "The City of Monstrous Debt." The burden of the indebtedness of Paris is notoriously heavy, and it is always growing heavier. There was a deficit in the past year's Municipal budget of £480,000; and the authorities are at their wits' end for a means of balancing the account. As it is, the local rates, taxes, and customs press so heavily on the population, that the prices of all the necessaries of life are almost double those ruling in London. Of course, this condition comes hardest upon the very numerous class of the respectable poor, including the lower ranks of official and other salaried persons. How a Parisian policeman with a wife and family lives, would be a revelation to his British brother in blue. Last year the Paris Municipality relinquished the *octroi* dues on wine, beer, and cider. Of course, the remission was extremely popular; but the consequence has been most unfortunate so far as the municipal treasury is concerned. The wine and beer dues used to bring in £1,600,000 a year; for Paris is a thirsty city. Old and new taxes on other things were imposed and reimposed with a view to making up this sum. But they have failed to do so by about £500,000; and, of course, the people who pay grumble dreadfully. Nor is this all; for the Prefect of the Seine, who has a budget of his own to make up, issued a supplementary precept of some £320,000 for extra expenses, which the ordinary revenues of his department had somehow failed to cover. What with one call and another, the purely local expenses of the City of Paris for the current year will amount to £13,365,282, which is the almost impossible rating of £4 6s. 8d. per head. Then, in addition, there are the State taxes. The funded debt of the City of Paris now stands at £80,000,000. This budget includes the outdoor relief of the poor, called the *Assistance Publique*, which is administered after socialistic ideas, and is most burdensome. Altogether, it is not wonderful that the Municipality cannot face with equanimity such a further loss of revenue as would ensue from the abandonment of their usual share of the gas profits.

When Technical Journalism is not Technical.

It is often contended, on public platforms and in other places where men talk too much to be accurate in all their statements, that one of the pressing needs of the English people in the present day is more technical education. Perhaps a little more of this particular sort of education would not hurt us as a nation; but it would be no gain if technical instruction should be divorced from common sense, as it unhappily is in some cases. Indeed, so true is it that the best schooling has its bad side, that a true lover of his country will always cherish the hope that there will ever be a few natives left outside the educational net, to grow up absolutely without the contamination of the schoolmaster. It will be an evil day when the self-taught, as well as the self-made, man shall be extinct; for such men have "the

"root of the matter" in them—the unwarped intelligence of members of a ruling race. They represent our forbears. But this by the way. One of the crying evils of the present day, both for England and America, is the mass of sham technical matter that is floating about, chiefly in the form of journalism, although there are books filled with it as well. This bulk of false technicality is worse than useless to the people who pathetically try to learn by it—it commonly fills their curious minds with half, or false, knowledge, which is worse than ignorance.

It is a mournful observation that the very first efforts of those who would learn something more than the newspapers can teach about technical matters, are usually entrapped and arrested by rubbishy publications which have no real connection whatever with the very arts or industries after which they call themselves. A technical periodical—should it not be technical? One would imagine so; but the rule is not generally observed. All the greater, therefore, is the obligation upon writers on technical topics who cannot be accused of want of competence, to take great heed that they do not make misleading representations on the subjects they pretend to treat of, because misrepresentations of technical subjects are certain to be pounced upon for popular reading, and most likely do harm before they can be corrected. For this reason, we desire to set right some misleading statements concerning gas fuel and cognate matters which recently appeared in the "Chemical Trade Journal," of Manchester. It was very pertinently asked here, if nothing more could be done to displace coal by gaseous fuel, by municipalities owning their gas-works, which might supply this fuel. It is certainly not to the credit of most municipalities of this category that they have been more solicitous to tax their gas consumers in aid of the rates, than to further the development of the use of gas for fuel and other purposes by selling it cheaply. Meanwhile, although the gas has remained dearer than it might be, the rates are nowhere conspicuously lower for the subsidy paid by the gas consumers. Our chemical contemporary remarks that for cities like Manchester or London, where there are so many office buildings, "the supply of gaseous fuel at an "exceedingly low price would not only be found practicable, "but remunerative." This is the first confusion of thought. It is not so much the actual price of gas in our big cities that leaves coal-fires in possession of so many office fireplaces, as the lack of commercial enterprise on the part of the suppliers of the gas. Those office occupiers who know gas-fires, do not find that they cost more than the usual charge for coal-fires, with attendance. The immediate question is, how to make this knowledge universal.

Our contemporary goes seriously astray, however, in making the statement that "with gas at half-a-crown per "1000 cubic feet, it is about three times as dear as coal, "and yet such a reduction could easily be made as would "bring gas of 16-candle power (real 16 candles in the "street-mains) within the reach of all." This is not the kind of statement that should appear as an expression of editorial opinion in a real technical periodical. But, as might be expected, the observation was made to lead up to something else, and that something else was the much-advertised action of Messrs. Brunner, Mond, and Co., in selling gas in Winnington at the price of 1s. per 1000 cubic feet. There is more than one way to tell that story, as was shown in last week's "JOURNAL." As it was originally put about, it was good enough for a financial newspaper, and might be warranted to find its way into "Tit-Bits" in the course of the ages; but it possesses no technical significance.

Lights in Aid of Street Arc Lamps.

A SOMEWHAT amusing statement respecting an alleged intention of the Westminster Corporation to improve the street lighting of their city by a provision of emergency fog lights went the round of the papers recently. It ran to the effect that, having regard to the failure of the lofty electric lights with which the main thoroughfares of Westminster are provided to penetrate the fogs, the Corporation have ordered a number of flare-lamps of the "Lucigen" type to be placed about on the street refuges and at the most important crossings—not to render the arc lamps visible, which would be hopeless, but to do what should be their work. This is the bare statement of fact, which the newspapers recorded approvingly, and praised the enterprise of the Westminster Corporation for accordingly. It was not perceived that the very suggestion constituted a most damning indictment of the system of street lighting which it was meant to assist. If the ordinary street-lights had been everywhere of fog-penetrating gas, instead of mast-headed, ineffectual electric arcs, these foolish modern successors to the torch of the link-boy of London story would not be needed. We call them foolish, because very plainly they mean the organization of a second public lighting service, if the provision is to be available when wanted; and this they are not likely to be. An emergency light which is only used half-a-dozen times a year is not often fit for use then. In a sense, the Westminster Corporation cannot help themselves, because they are tied to the electric lights for thirty years, at the not stingy recompense of from £30 to £32 per lamp per annum. To this expense must now be added that of the emergency flare-lights, which will have to be kept somewhere handy. Cellar rent in Westminster is not low. And should a lamp go wrong, and the hats and clothing of wayfarers get a sprinkling of oil, how popular the Corporation will then be! And to think that they might have had gas to better purpose for less money. It is not a very pleasing reflection, nor one that flatters the reputation for common sense of the public authority concerned.

Circular Inquiries.

Another flagrant abuse of circular inquiries is brought to our notice by a gas manager who is, and pardonably so, incensed with the offensive document of which he was the recipient, and which he has forwarded for our edification and information. Inquiry circulars fall readily into two distinct classes—those which are perfectly admissible and legitimate, and those which are not. In the former order—broadly defining them—may be placed those circulars which have for their ultimate purpose, by the collection of data, the benefit of the whole gas industry, or some large part of it. Such a circular was that which recently emanated from Mr. R. G. Shadbolt on the Sunday labour question, and which was the subject of a paragraph last week. The second and objectionable class of circulars comprises those which issue from a local authority or company, and are as a rule intended only to serve their own particular and frequently selfish ends. These circulars again can be sub-divided into two. Some are of a positively discourteous and impertinent character, in that they seek information of a personal nature relating to the position and emoluments of neighbouring managers. All such inquisitorial communications should be promptly consigned to the waste-paper basket or the fire. Their only intention can be to enable a Committee or Board, who are short of business capacity or painfully penurious, to bring themselves to anchor on the fearfully momentous point of whether their hapless manager is worthy of a small addition to what is mostly in these cases a very slender hire. If a body of men cannot estimate for themselves, without roaming abroad, the value to them of the services of an official, then the sooner they are shunted from the control of a public business concern the better will it be for all interested—whether as ratepayers or as shareholders. The second division of the objectionable class of circular are those which, in a clandestine way, seek benefits from the brains of gas engineers and managers without reward, and so make up, "on the cheap," for the want of experience and capacity in the governing body. For the information of such bodies, we may say (as they do not appear to be aware of the fact) that there are hundreds of gas engineers in this country—some in their own neighbourhoods—who are competent to advise them on all manner of professional questions, in the ordinary way of business. It is only fair to say that we are inclined to believe that, more often than not, when a gas manager's name appears at the foot of a circular of this kind, he is merely acting as agent for his superiors, and that he is as much ashamed of this method of obtaining information as the recipients are vexed in being worried by the inquiries.

The Personal Circular Illustrated.

The circular received from our annoyed correspondent is of the personal class; and it has been sent out at the instance of the Chairman of a Gas Committee. The specimen circulars we have are mostly the productions of the elect of a town. The "queries" in this fresh case include: "(1) What salary do you pay your officials: (*a*) "engineer and manager; (*b*) collector; (*c*) treasurer; (*d*) "secretary? (2) Does the manager perform the duties of

"all the above officers? If not, what are his duties? (3) "Has the manager any emoluments beyond his fixed "salary?" Most readers will be able to characterize these inquiries with suitable brevity. The circular has been carefully filled up by our correspondent; but we are not authorized to impart the information to Mr. Chairman. However, there will be no breach of confidence in quoting the reply to the interrogatory, What are the manager's duties? Our correspondent replies: "Various, such as answering circular "inquiries;" and in a footnote he says: "Your Chairman "is altogether outside the bounds of courtesy in asking the "value . . . put on my services. He might as well "ask about my savings as my earnings. This is scarcely "pardonable in a friend, and not thinkable from a stranger." Gas managers will best serve the dignity of the profession by refusing to countenance this cheap method of getting instruction in gas-works government. *Verbum sat sapienti.*

Payment of Valuers by Results.

In our "Legal Intelligence" will be found the reserved judgment of the Recorder of Poole (Mr. G. Pitt-Lewis, K.C.) in the appeal of the Poole Gas Company against an increase of about £800 in the rateable value of their property. The Company's valuers (Messrs. Valon and Ryde) put the figures at £935 and £917; those acting for the Assessment Committee (Messrs. Castle and Fuller), at £1912 and £1932. The learned Recorder has come to the conclusion that the gross value should be £1894, and the net value £1524—making an increase of £405 on the old assessment, or, in ordinary parlance, he has "split the difference." The amount in question is not large, and we only allude to the matter here to direct attention to the general remarks made by the Recorder by way of introduction to his judgment. He condemned payment of valuers by results as "the worst "form of quackery;" and he expressed the hope that the Surveyors' Institution would make a bye-law providing that a man who obtained payment in this manner should be deemed to be guilty of unprofessional conduct. He also criticized the practice of allowing 17½ per cent. on the tenant's capital, and said he thought, as a rule, 12½ per cent. was as much as could be expected. The Recorder's remarks on both points may be left without comment.

A Decennial Test of Gas Consumption.

There are many things about the Brentford Gas Company which are instructive; and we may put the speeches of the Chairman (Mr. Howard Charles Ward) in the category. There is scarcely a meeting of the proprietors at which some brilliant little point does not glitter to attract observation, and set one thinking. In his address last Friday, there is an example. He told those present that in the decennial period from 1891 to 1901, there had been an increase of 64 per cent. in the number of tons of coal carbonized and the equivalent of oil used; and going back twenty years, an increase of 182 per cent. In the gas-rental there had been in the last decade an increase of 69 per cent.; and in the twenty years, one of 147 per cent. Now these are very remarkable figures; and when they are studied, they produce a little surprise. It may, we think, be taken that the condition of the Brentford Company in regard to opportunity for development is that of most gas undertakings in thriving suburbs and large towns; and, on this hypothesis, the figures seem to show clearly which of the last two decades witnessed the most notable leap in progress in the gas industry. Mr. Ward gave his figures to show the great strides made by the Brentford Gas Company; but we find instruction in taking them as a gauge of the industry's period of most conspicuous—though not necessarily largest—development. In other words, to make the point clear, the period in which the industry spread itself outside its former comparatively small compass with remarkable speed.

A Decade of Almost Unaided Growth.

Now taking the material required for the production of gas, we have the fact that the Company had an increase in the past ten years of 64 per cent.; while if we deduct this from the total percentage increase of the twenty years (182 per cent.), there is a balance of 118 per cent. But, of course, this last percentage must not all be credited to the preceding decade; for the reason that the 182 per cent. increase is on the comparatively small manufacturing requirements of the Company in 1881, and the 64 per cent. is the advance on the greater needs of 1891. But still it is a sufficient guide to show that the period from 1881 to 1891 was that in which the Company, and we opine the gas industry generally, passed from slow progress into a luxuriant expansion. Now when we consider in comparison the fields which the Company had in the first decade and the second, it is difficult to find the reason for the distinguished progress made in the former. In 1881, the price of gas was 3s. 9d.; and by 1891 it was reduced to 3s., which figure and a penny or so below we believe have been the charges, for the greater part at all events, of the past decade. A particularly low price then was not the reason for the great spurt between 1881 and 1891. During that period, too, gas-fires and gas cooking-stoves had not become so popular as they are to-day; and the penny-in-the-slot meter consumer was not then one of the governing factors of progress as now. However, there the fact stands with striking prominence that it was in the ten years ending with 1891 that the Company, taking as a basis the raw material used, made the most conspicuous progressive move, considering that it was unaided by many of the outlets for consumption existing to-day. The Company's present large percentage increase upon former great percentages shows a robust constitution, of which the proprietors may well be proud.

Investors and Rates of Interest.

The proposition was advanced by Mr. Alexander Dickson at the meeting of the Bromley Gas Consumers' Company last week, that high nominal rates of interest on gas shares do not command in the market proportionate amounts to the lower rates of interest; and he cited the shares of the Company in proof of this. This is one of those little points of interest that sometimes escape the notice of gas directors; and it supplies one good argument in favour of the unification of stocks at a lower rate than the higher existing rates of interest. It is only necessary to scan our share list for ample corroboration of Mr. Dickson's proposition. If the reader looks at the "yield-upon-investment" column, and at those companies with 10 and 7 per cent. stocks, it will be seen that the investor does pay, as a rule, a proportionately higher price for the shares bearing the lower rate of interest; the lower yield on investment testifying this to be the case. In all instances but two in the list, it is so. It is so in the cases of the Alliance and Dublin, Brighton, Bromley, Commercial, and Liverpool Gas Companies. The only real exception is in the Brentford Company, where the yield per cent. on the market price is greater on the 7 per cent. stock than on the 10 per cent. Even in the case of the 5 and 3½ per cent. stocks of the Tottenham Company, we have the same experience, that the purchaser pays a higher rate for a smaller return on his investment. This seems to abundantly indicate that the nearer the price of good securities approaches the nominal value—and the price is, of course, governed by the rate of interest—the better market there is for them. But in the case of the West Ham Gas Company, we find something like a reversion of this general order of things. It appears to disclose something else—that the lower the nominal value of shares the more freely are they dealt in; for in this case the yield on the 10 per cent. £5 shares (paying 9 per cent.) is lower than in the case of the 7 per cent. £10 shares (paying 6 per cent.), which shows that, in proportion, the investor here pays more for the share of the lower nominal value. These facts should serve as one among other inducements to both shareholders and Directors who have high-priced shares and stocks, carrying high rates of dividend, to bring them down to a more attractive basis, because the more freely good securities can change hands, the more freely are they likely to change, and the better (if there are no detracting influences) the price will become.

Investment Prices and the Sliding-Scale.

There is, however, one point in connection with shares of two denominations in a Company with good prospects, and working under the sliding-scale, which justifies the payment of a relatively larger price, having regard to the present rate of interest, for the stock or shares of the second class, and that is that both classes participate equally in any increases of dividend consequent on reductions of the price of gas. For example, supposing £234 is paid for a 10 per cent. stock and £173 for 7 per cent. (at which prices

the yield on investment would be £4 5s. 6d. and £4 os. 11d. per cent. respectively), then increases in dividend under the sliding-scale would give the purchaser of the second class stock a greater advantage than the buyer of the first class. One per cent. increase on £173 is better than one per cent. increase on £234.

Private Bill Legislation.

Now that public parliamentary business is in a fair way of being accelerated by the adoption of new rules of procedure, there is a good opportunity for bringing about some necessary reform in Private Bill Legislation. We have written upon this subject in the past; and therefore need not repeat some of the directions in which both promoters and opponents of private measures desire relief. But it will be seen from our "Parliamentary Intelligence" that there is promise of an inquiry into the whole question. Mr. Balfour thinks it is desirable that a Committee should be appointed for the purpose; and, if his view is shared by both Houses, the sooner such a Committee is set to work the better. Another kindred matter has been raised. Mr. D. A. Thomas has tried to move the House to instruct the Committee whose duty it is to select members to serve on Committees considering Private Bills not to except members on the general ground of the peculiar nature of their professions, businesses, or avocations. When a man goes to Parliament, the work of Parliament should, of course, be his first consideration; but we should pray earnestly against the Committee of Selection being abolished and a roster instituted. The Committee do try, though they sometimes fail, to secure men for the Private Bill work who are qualified; but if all Members of Parliament were called upon to serve in their turn—well, perhaps it will be sufficient to say that we should then pity some of the Private Bills. The House very wisely declined to interfere with the discretion the Committee of Selection possess.

The St. Helens Explosion.

Chemical experts are not yet satisfied as to what actually caused the explosion at the United Alkali Company's works at St. Helens which did such considerable damage to the Corporation Gas-Works. Potassium chlorate was at the bottom of the trouble; but the point at issue is, Is this substance capable of exploding by itself, or must there be a combination with some other substance before explosion can occur. The London Section of the Society of Chemical Industry had before them a communication from Dr. Dupré on the subject yesterday week, recounting some investigations he had made. He appears to have proved to his own satisfaction that chlorate of potash will explode by itself on the application of heat; but, in the discussion, other chemists doubted this, and held that something else must enter into combination. One gentleman explained the explosion in this way: That a fire broke out in the store where the chlorate of potash was placed in barrels. Some of the barrels were burnt; and violently fell. Consequently a large amount of carbon in an extremely fine state of division was precipitated into the atmosphere of oxygen; and it was this that caused the explosion. Altogether there is a pretty little question for solution still hanging round this explosion. The point upon which there is no doubt is this—that, however the explosion occurred, its local effects were comparatively small, and that it wreaked its vengeance with extreme violence upon objects at a distance. This being so, the public will be greatly obliged to the experts if they will quickly settle their differences of opinion; so that it may be known whether or not it is necessary to chain up chlorate of potash with the class of dangerous explosives. The chemical manufacturers would not like this to happen; but the public and property—gasholders, for example—have a great claim to protection.

On Toasts.

The toast submitted by Sir Alexander Binnie—"Improvements in Passenger Transit"—at the recent anniversary dinner of the Institution of Junior Engineers, afforded him an opportunity for making an excellent speech on locomotion, present and future. We, however, only notice the matter here in order to suggest that it would be much better if all technical societies would introduce the plan of toasting sentiments, rather than confine themselves solely to personal ones. Such a course would add greatly to the interest of after-dinner proceedings which otherwise (however worthy the objects of the personal toasts may be) are apt to become a trifle dull. On the occasion to which we refer, for instance, Sir A. Binnie was enabled to deliver a most valuable address on a subject of the greatest importance to the members of the Institution. We trust in the future to hear many such speeches made at the dinners of societies connected with the gas industry.

WATER AFFAIRS.

The Government Water Bill.

THE introduction by the President of the Local Government Board, on the 30th ult., of his Bill to deal with the supply of water in the Metropolis and its suburbs, was promptly followed by the publication of the text of the measure two days later. The details of the Government scheme are now known, and therefore it is permissible to inquire whether they are such as to render the Bill to carry it into effect an acceptable measure to the parties chiefly concerned—namely, the ratepayers, the Water Companies, and the consumers. If the representatives of the first-named body constituting the Progressive party in the London County Council are to be regarded as voicing the popular opinion on the London Water Question, they are certainly not. In the first place, notwithstanding all that has been said, the Council still cling tenaciously to the idea that they should be the Water Authority for London—that, in fact, they have received a "mandate" to this effect from the ratepayers. This is evident from the motion which Dr. Macnamara intends to move, presumably on their behalf, on the second reading of the Bill. It sets forth that "no Bill "for the transfer of the undertakings of the London Water "Companies will be satisfactory which does not provide for "purchase by the London County Council exclusively, and "representation by co-optation to the County Council Water "Management Committee of such extra-Metropolitan areas "within the area of supply as may seek such representation." Next, the Progressives object to the extent of the Council's representation on the proposed Water Board. Ten members out of sixty-seven is regarded as a "monstrous "disproportion," considering the interests engaged, and bearing in mind the fact that the last Royal Commission gave the Council the same number on a Board of thirty. Moreover, it is urged that the outside water area to be represented is not that which is supplied, but that which the authorities are empowered to supply. Finally, the objection is raised that the Board will be "unwieldy, grotesque, "and unworkable"—a body consisting of men "gathered "from all the corners of the earth"—and will break down in a couple of years. We need not go further. These and doubtless other objections to the Bill will be brought forward at the meeting of the Progressive party called for next Monday in St. James's Hall. Meanwhile, the opinions of the Water Committee of the Council in regard to the Bill are fully set forth in a long report which will come before the Council at their meeting to-day. We give elsewhere an indication of the views of the Committee on the water question, and the resolutions they recommend the Council to pass thereon. It will be seen that objection is raised to the constitution of the Board and also to the financial provisions of the Bill, and the Council are asked to sanction the preparation of a petition to be presented against it.

Having disposed of the ratepayers, let us see whether the Water Companies have any grounds for objecting to the Government Bill. Before doing so, it will perhaps be well to state exactly what we consider they had a right to expect at the hands of the Government. As the result of a long and exhaustive inquiry, a Royal Commission recommended that the Companies' undertakings should be acquired by a Water Board, not because they had been inefficiently conducted—on the contrary, the Commissioners acknowledged that the Companies had, on the whole, "performed their "duties to the public satisfactorily and well"—but in the general interests of the ratepayers and consumers. The purchase was to be effected by agreement, if possible; if not, by arbitration, "on the terms usual in cases of compulsory "purchase." The Commissioners were careful to point out that most of the Companies had gone through periods of struggle and difficulty, during which the shareholders had received an inadequate return for their money. It was acknowledged that some of them had reached, and others

were approaching, a more prosperous condition as the result of privileges granted by Parliament. At the same time, the Commissioners expressed their inability to see anything which led them to suppose that, if the undertakings were compulsorily purchased, Parliament would sanction any exceptional provisions, or "depart from the terms of arbitra-"tion usual where the property of private persons is taken "from them against their will." They therefore assumed that, if the purchase policy were adopted, the price would be settled by an arbitration "conducted on the lines of "the Lands Clauses Act," though possibly, in view of the magnitude of the undertakings, there might be a different constitution of the tribunal.

Now, how have the views so clearly expressed by the Commissioners been adopted by the President of the Local Government Board in drafting the Bill which he has asked the House of Commons to accept as "an honest attempt to "deal with a very difficult question"? He has constituted a representative fluctuating Water Board, instead of, as suggested by Lord Llandaff's Commission, a permanent body, the members being "selected on account of their busi-"ness capacity, and, if possible, their knowledge of matters "connected with water supply." It will be more than twice the size of that indicated by the Commission, and the majority of the members it can hardly be supposed will be imbued with a desire to come to terms with the Companies. The representatives from Spring Gardens, and their possible influence over their fellow-members, will have to be reckoned with; for we know, on good authority, what is the effect of "a little leaven." Consequently, resort to arbitration will be inevitable. It is here that, it seems to us, the Water Companies have cause to complain of the treatment they have received. Instead of the precedent invariably followed, and contemplated by the Royal Commission, of arbitration under the Lands Clauses Act—a mode of procedure particularly obnoxious to certain members of the County Council—a special Court of Arbitration is to be constituted to determine the value of the properties to be acquired, and their award is to be "binding and conclusive." We do not for a single moment question the competence of the three Commissioners named in the Bill to discharge the important duty entrusted to them. They are "all, all "honourable men." Our point is that, in view of the interests at stake, the final determination of the value of such a group of undertakings as those in the hands of the London Water Companies should not have been left to a triumvirate, however distinguished. We submit that a far better course would have been to constitute the Board, and allow them, in the event of disagreement as to price, to appoint an arbitrator; the Companies, as sellers, doing likewise; and the arbitrators nominating an umpire as usual. Such a body could have been bound down not to give the 10 per cent. generally allowed on compulsory sale; but they might justly have been permitted, in the language of the report of the Commission, to "award something beyond the bare "value of both present and prospective income." In constituting the Court of Arbitration in the way defined in the Bill, and in giving them specific instructions as to what they are to disregard in ascertaining the value of the properties to be purchased, the Government are, in our opinion, establishing a precedent which may prove dangerous.

Another matter in respect of which the Companies have not, in our opinion, been at all favourably treated by the Government relates to the taking possession of the properties by the Water Board. The "appointed day" provisionally named in the Bill for this important proceeding is the 1st of January next, or some other day, within twelve months, with the sanction of the Local Government Board. Assuming that the Bill goes through, it will probably not receive the Royal Assent before July, by which time the holiday season will have fairly commenced. To suppose that a body entrusted with administrative powers such as those conferred by the Bill can be constituted and brought into working order in a few months, appears to us to be ridiculous. Some people seem to imagine, because the water-works in the hands of certain of the large Provincial Municipalities are well managed by Committees, that the whole business of water supply is extremely easy. They would probably find they were mistaken if they came to be engaged in it. Of course, the appointed day is a "moveable "feast" up to a certain limit; and provision is made for enabling the Companies to carry on their undertakings thereafter. But surely this is a very mixed arrangement. Would it not have been better to have fixed the first date twelve months later—namely, the 1st of January, 1904—and allowed the Local Government Board to move it on as now provided? In our opinion, an all-round advantage would be gained thereby. Ample time would be afforded for constituting the Board and getting it into working order, arranging the financial operations attendant upon the purchase, appointing new officials, selecting those to be retained in the service, and generally preparing the way for a fair start. There would be no divided authority by such an arrangement as this. The Companies would remain in absolute possession until the day finally determined, when the whole of the property would pass into the hands of its new owners.

The effect of the change of management of the water supply upon the large body of consumers has still to be considered, but this may well be left till a future occasion.

A Valuable Unearned Increment.

THOSE of our readers who are at all familiar with the early history of the Thirlmere Water Scheme of the Manchester Corporation will no doubt remember the name of the Countess Ossalinsky in connection with a very troublesome piece of negotiation which the Corporation had to carry through before they could proceed with it. The recent death of that venerable lady, in London, brings to remembrance one of the most remarkable instances of "unearned "increment" to be found in the history of property. The grandfather of the Countess was the copyholder of about 714 acres of land in the Thirlmere Valley and on the neighbouring fells; and he had sufficient far-sightedness to convert it into freehold at a time when no one had the slightest idea that the waters of the lake would be required for the supply of Manchester. In fact, it is on record that when a representative of the Corporation was "prospecting" in the neighbourhood, he evoked from some stone-breakers an expression, in the Cumberland vernacular, equivalent to the Scottish saying about a man having "a bee in his bonnet." These simple people thought there was "not enough money "in all the world" to carry out such a scheme. Nevertheless it was found; and a good round sum (though less than she claimed) went to the fortunate Countess. Her rental of about £520 per annum was valued by the Corporation, after making liberal allowance for improvements and compulsory sale, at from £20,000 to £25,000; whereas the lowest valuation made on behalf of the Countess was £72,000, and the highest more than £100,000—the estimate including large sums as extra value put upon the land in consequence of its suitability for water-works purposes. The matter was referred to a single Arbitrator, and he gave the Countess £70,000, in round numbers, exclusive of the value of the sheep which had to be bought. This amount, however, was not paid, as, after legal proceedings were instituted by the Corporation to set aside the award, a compromise was effected. The matter is of general interest, as it led to legislation which established the system of appointing umpires in cases of this character; and, morever, reference to it is specially opportune at the present time, when a proposal is before Parliament to impose the responsibility of determining the value of the undertakings of the Metropolitan Water Companies upon three Arbitrators, instead of two with an Umpire, in accordance with long-established precedent. Two heads are proverbially better than one. But in arbitrations, one—that of the "oversman," as he is called North of the Tweed—is very frequently better than two.

Manchester and District Junior Gas Association.—The members of this Association held their second annual dinner on Saturday at the Exchange Hotel, Manchester. The President (Mr. S. E. Halliwell) occupied the chair; and there were present the Vice-President (Mr. C. Berry), the Joint Secretaries (Messrs. E. J. Wellens and F. Oldfield) and upwards of thirty members and invited friends. Conviviality rather than speech-making was the feature of the preceedings, which throughout were of a thoroughly enjoyable character. The only toast following that of "The King" (honoured most loyally), was "The President of the Association," briefly proposed by Mr. F. West, who remarked that Mr. Halliwell discharged the duties which fell upon him with a geniality and tact they all admired, and added dignity to the office by the high position he had attained in his profession. The President thanked the members very sincerely for the honour they had paid him, and assured them that he would do his best in any service he could render. He expressed the hope that all the members would assist him in promoting the best interests of the Association. The remainder of the evening was occupied in going through an excellent musical programme.

ESSAYS AND REVIEWS.

THE LEGAL RELATIONS BETWEEN GAS SUPPLY UNDERTAKINGS AND CONSUMERS.

THE recent application in the Chancery Division, by the Receiver appointed by the Court to manage the affairs of the Mansions Proprietary, Limited, for injunctions to restrain, first the Electric Light and then the Gas Company from discontinuing their services to the premises at which the business of the Mansions Proprietary, Limited, is carried on, and the action heard at the Clerkenwell County Court on Dec. 19 and Jan. 10 last, relating to the liabilities of an incoming tenant for arrears of gas due from the outgoer, raise many points of interest to gas suppliers. It will, therefore, we think—especially in view of the enquiries that occasionally reach us—be useful to consider carefully the enactments and judgments bearing upon the various points connected with the relations of gas undertakings with consumers who are in financial difficulties.

Where the debtor is an individual, or a private firm of partners, the following circumstances may arise:

A meeting of creditors may be called to consider the position of affairs.

The property of the debtor may be assigned to a trustee or trustees for the benefit of the creditors generally.

A receiving order may be made against the debtor.

A receiving order having been made, a proposal may be made to the creditors to accept a composition in satisfaction of the debts due to them, or to assent to a scheme of arrangement of the debtor's affairs.

The debtor may be adjudged a bankrupt, and a trustee appointed to carry on the business and wind up the estate for the benefit of the creditors.

In the case of an individual debtor, a private firm, or a public company, it may happen that:

A mortgagee, the mortgage money or interest having become due and default made in payment thereof, may enter into possession of, and sell, the property mortgaged, or may appoint a receiver of the income of the property.

Where the debtor is a public company:

The company may go into liquidation.

The debenture holders may appoint a receiver under the debenture deed, or may apply to the Court of Chancery to appoint, and that Court may appoint, a receiver and manager to take possession of the premises and manage the business for the benefit of the creditors and of the company.

What is the position, what are the powers, of the gas undertaking supplying the debtor in the various cases hypothecated above? That is the important matter to be considered. Before doing so, however, it is necessary to look at some general principles laid down in the Acts governing the relations of a gas undertaking and a consumer. Every gas undertaking to which the provisions of the Gas-Works Clauses Act, 1847, and the amending Act of 1871, apply must, upon being required so to do by the owner or occupier of any premises situated within twenty-five yards from any main of the undertaking (or such other distance as may be prescribed) give and continue to give, a supply of gas for such premises, subject to certain conditions being fulfilled by the owner or occupier requiring the supply. These conditions provide * for the service of a notice requiring the supply within "a reasonable time;" the signing of a contract, if so required; and the provision of security, if so required. If security be not required as a condition precedent to the granting of the supply, or if the security given be afterwards found to be invalid or insufficient, the undertakers may subsequently require the consumer, by a seven days' notice, to provide adequate security—the nature and amount of which may (if not settled by agreement) be determined by two justices or a magistrate †—and, failing the provision of such security, may discontinue to supply gas for such premises so long as such failure continues.

There is, of course, one other condition to be fulfilled by the consumer in order that he may be able to require the undertakers to "continue to give a supply of gas;" and that is that he shall pay for that gas so soon as, under his contract with the undertakers, he can be called upon to do so. Otherwise, the undertakers are relieved, by section 16 of the Act of 1847, of their liability to continue the supply: "If any person supplied with gas by virtue of this or the Special Act neglect to pay the rent due for the same to the undertakers, the undertakers may stop the gas from entering the premises of such person by cutting off the service-pipe, or by such means as the undertakers may think fit." Neither here, nor in the Act of 1871, is there any definition of what constitutes "neglect to pay;" nor do we know of any decision on the point. The above-quoted section does not require the undertakers to give any notice of their intention to discontinue the supply; but the Metropolis Gas Act, 1860, sec. 21, provides that, in the case of the rate for gas being "in arrear," three days' notice in writing to the consumer before discontinuing the supply "shall be sufficient." How soon after the first demand for payment is made the rate for gas can be said to be "in arrear," or the consumer be said to have "neglected to pay," is not determined. In certain private Acts, it is provided that a summons may be applied for in case any person fails to make payment for "fourteen days after demand;" and it would probably be held that a consumer was "in arrear" and had "neglected to pay" if such a period had expired since the first demand was made for payment.

This right to discontinue supplying a consumer who neglects to pay the amount due for gas supplied has been held to extend to all the premises at which the consumer is using the undertakers' gas, even though the gas-rate be only in arrear in respect to one or some of the premises. At least, a section in a statute of the Province of Canada, practically identical in wording with section 16 of the Gas-Works Clauses Act, 1847, was so construed by the Judicial Committee of the Privy Council in the case of *Montreal Gas Company v. Cadieux*;* and there is no reason to doubt that the House of Lords would take the same view of the English statute.

Broadly speaking, then, a gas undertaking must continue to supply a consumer so long as the consumer continues to pay the accounts as they accrue. Failing such payment, the gas supply may be cut off from the premises of the consumer; and the right so to cut off the gas is not limited in any way. It is absolute. All the difficulties in the cases enumerated at the commencement of this article arise over this one point: Whether the defaulting consumer remains the "owner or occupier" of the premises within the meaning of section 11 of the Gas-Works Clauses Act, 1871, or, to put it another way, whether the premises continue to be "the premises of such person" (the "person supplied with gas" who has neglected to pay) within the meaning of section 16 of the Gas-Works Clauses Act, 1847. Otherwise—that is, if the defaulting consumer has left and has been succeeded in occupation by a new "owner or occupier"—the undertakers must, except in special circumstances, give to the successor a supply of gas, regardless of the fact that a debt is still owing for gas used on the premises; provided, of course, that the successor is willing to comply with the statutory requirements of the undertakers as to contract and security. The special circumstances in which the undertakers may "require from the next tenant" payment of the arrears due from the outgoer are where "such incoming tenant has undertaken with the former tenant to pay, or exonerate him from the payment of, such arrears."† This clause leaves it uncertain which of the following courses are open, in such circumstances, to the undertakers, namely—(1) To refuse to supply the incomer until the arrears are paid; or (2) If the supply has been granted before the agreement to pay the arrears comes to the knowledge of the undertakers, to cut off the supply on failure or refusal to pay the arrears; or (3) To sue the incomer while continuing the supply; or (4) To refuse or cut off the supply and, in addition, sue the incomer.

Clause 39 of the Metropolis Gas Act provides that the incoming tenant shall not be required to pay the arrears of the previous tenant, unless the former has agreed with the latter so to do, or unless there has been collusion between the incoming and outgoing tenant. In the absence of these circumstances, the gas company "shall supply gas to the incoming tenant." Here, by inference, the Company are entitled, where agreement or collusion can be proved, to refuse to supply the incoming tenant until the arrears are paid. But, here again, it is uncertain whether the words "require from the next tenant" give the Company the power of suing, as well as refusing to supply, the new tenant.

It is upon this point that the pending appeal in the case of *The Gaslight and Coke Company v. Cannon Brewery Company* really turns, though the plaintiffs are relying upon their Private (not the Public) Acts. As has already been pointed out in the "JOURNAL," the Gaslight and Coke Company possess, in section 18 of their Private Act of 1872, a power possessed by no other gas undertaking. That section is worded exactly in accordance with section 39 of the Metropolis Gas Act, with the important interposition of the words italicized in the following transcript of the section:

> In case any consumer leave the premises where gas was supplied to him, without paying to the Company the rate or meter rent due from him, the Company shall not require from the next tenant of the premises payment of the arrears so left unpaid, unless the incoming tenant agreed with the defaulting consumer to pay the arrears; *or unless the incoming tenant shall continue the trade or business of the outgoing tenant, and shall have paid to the owner, lessee, or mortgagee in possession, or to the outgoing tenant of such premises, a consideration for so doing.* But the Company shall, notwithstanding any such arrears, in the absence of collusion between the outgoing and incoming tenant, supply gas to the incoming tenant, as required by this Act, on being required by him to do so.

In the case of *The Gaslight and Coke Company v. Mead*, it was decided (Jan. 17, 1876), by Justices Blackburn and Lush, that the Company's Acts did not give them power to recover from, by suing, an incomer who was within the exceptions set out in the above section, the arrears due from the outgoer—only, apparently, to require payment of the arrears from the incomer as a condition of their supplying him with gas. This is the decision which the Gaslight and Coke Company are endeavouring to get reversed; and the outcome of their action against the Cannon Brewery Company—who purchased and carried on the business of a

* Gas-Works Clauses Act, 1871, sec. 11.
† *Ibid*, sec. 16; Gas-Works Clauses Act, 1847, sec. 42.

* See "JOURNAL," Vol. LXXIV., p. 373.
† Gas-Works Clauses Act, 1871, sec. 39.

grocer who was indebted to the Gas Company at the time of the sale—will be awaited with interest, having, as will be seen, an important bearing upon the interpretation of section 39 of the Metropolis Gas Act and of section 39 of the Gas-Works Clauses Act, 1871.

With this somewhat lengthy preface—necessary, however, for the proper understanding of the various points to be considered—we may now proceed to an examination of the position and powers of a gas undertaking in certain special circumstances where difficulty has arisen in regard to the payment of accounts due for gas supplied.

Notice of Meeting of Creditors.

The receipt of a notice from a consumer, or from a solicitor or accountant acting for a consumer, to the effect that the debtor finds it necessary to explain his position to, and ask the consideration of, his creditors, and for that purpose is summoning a meeting of those creditors, presents no difficulties to a gas manager. If there be an account already accrued due from the consumer—as there almost invariably is—a notice requiring payment within three days, and stating that in default of such payment the supply of gas will be discontinued, will, if the business be worth carrying on, obtain prompt payment. In a large number of cases where the creditors are called together, the business is worth carrying on, and the gas account is paid in full to prevent stoppage of work. Should the amount due for gas be a heavy item in the liabilities which there is great difficulty in immediately settling, the gas company would certainly require an acceptable guarantee as to ultimate payment in full as a consideration for continuing the supply. In the unusual event of there being no accrued debt, a seven days' notice can be served, requiring security for the payment of all accruing and future accounts—failing the provision of which, the gas will be cut off. So far, however, no legal points have arisen; the foregoing only relating to the exercise of an undoubted legal right. The calling of a meeting of creditors does not affect the legal relations of supplier and consumer of gas.

Assignment to Trustee.

Not infrequently, when a business is in difficulties, the proprietor will execute a deed assigning his property to a trustee, or trustees, for the benefit of his creditors and of himself. The trustee is pretty sure to claim a supply of gas without paying the debt due to the time of his taking over the business. In very few cases is he entitled to such a supply, not being an occupier within the meaning of the Acts. For although the general assets of the business are assigned to the trustee, there is almost invariably one exception, and that is the lease of the premises. In order that the trustee may not be encumbered with the liabilities attaching to the lease, that is, by a special arrangement, allowed to remain vested in the debtor, who cannot, however, dispose of it without the permission of the trustee. That being so, the debtor remains the legal occupier of the premises, whether he continues in physical occupation or not. The trustee's position on the premises is, therefore, only in the nature of a caretaker "put in possession of the premises of a defaulting consumer to manage his business for the benefit of his creditors and himself." Such a person, as we shall see presently, has been held (Justice Lindley in *Paterson v. The Gaslight and Coke Company*) to be not entitled to a supply of gas without paying the gas debt of the debtor. There is, in short, no change of occupier; and the gas undertaking's rights under section 16 of the Act of 1847 are unimpaired.

Should there be no lease of the premises, only a temporary tenancy—weekly, monthly, or quarterly, as the case may be—the trustee may become the legal occupier, entering into a fresh tenancy agreement with the owner. It might then—though in the absence of any decided case it is not certain that it would—be held that the trustee would be entitled to a supply of gas without paying arrears. Certainly, a supply should never be granted to a trustee under a deed of assignment who refuses to pay arrears, until he has—by production of the deed, or otherwise—proved that he and not the debtor is the legal occupier of the premises. There cannot be two separate legal occupiers of the premises at the same time.

Receiving Order.

The position of the gas undertaking when a receiving order has been made against a consumer is defined by the judgment in the case known as *Re Smith, ex parte Mason* (1893, 1 Q.B. Div. 323), or, more familiarly, as the case of the South Metropolitan Gas Company and the Brixton Bon Marché—a business carried on by Smith, against whom a receiving order was made. The Company cut off the gas for the non-payment of £173, and refused to supply the Official Receiver until the arrears were paid—the debtor not having been adjudged a bankrupt. The amount was paid under protest, and the Trustee in the bankruptcy applied to have the money returned. The following is the essential portion of the judgment pronounced by Mr. Justice Vaughan Williams:

> It is conceded that the Official Receiver cannot call on the Company to supply him with gas unless he is an occupier or owner within the meaning of section 11 [Gas-Works Clauses Act, 1871], and it is also conceded that there cannot be two owners or occupiers of the same undivided premises at the same time. That being so, the Official Receiver cannot claim the supply of gas as such Official Receiver, unless he can say that the occupation of the debtor has determined. It is plain that the occupation of the debtor has not determined. The decision in *Rhodes v. Dawson* [16 Q.B Div., 548] shows that his estate is unaltered by the making of the receiving order; the same premises continue to be vested in him. Then it was said that the contract has been put an end to. I do not assent to that proposition. The estate therefore remained the same, and by that it seems to me that the occupation of the debtor remains the same. I do not know whether there might not be a possible case of a debtor absconding and leaving his premises vacant under such circumstances that he would be no longer occupier. There is no suggestion of that here; the debtor was occupier in fact, notwithstanding the making of the receiving order and consequent appointment of the Official Receiver by virtue of the statute. The Trustee's motion must be refused.

No appeal was made against this judgment, which has, moreover, not been over-ruled or affected by any subsequent decision. In delivering judgment in the *Paterson v. The Gaslight and Coke Company* case, Mr. Justice Lindley referred to the Bon Marché case and said: "This decision appears to me to have been correct, for the Official Receiver was only an 'occupier' in the sense of being a caretaker."

(To be continued.)

THE VALUATION OF PUBLIC SUPPLY WORKS.

The valuation of gas-works, water-works, and electricity supply undertakings for transfer to new owners is treated of in the "Engineering Record" by Mr. Nicholas S. Hill, jun., of Baltimore and Charleston, where he was Manager of the Consolidated Railway, Gas, and Electric Company. It is in connection with the formation of consolidated schemes that the transfer of public supply plants most frequently occurs in the United States, though municipal purchase is not unknown. Although the principle involved is the same in all cases, Mr. Hill remarks that there is a great difference in the methods of valuation where the purchaser is an individual, a syndicate, or a municipality. Conditions vary so much that no formula for arriving at the proper value of this class of property can be stated; and the engineer, as expert, must be called in to put a figure to the qualifying considerations which exist in every case.

There are, however, even in American practice, certain general rules in regard to valuation which should always be followed, and conditions which should always be noted. In general, there are two methods of valuation recognized—first, by capitalization of the net earnings; and, secondly, by actual valuation of structural cost. In the first place, although the idea is simple enough, there is so much difference in methods of book-keeping that no engineer can accept any general statement of operating expenses and net earnings until he has properly examined the accounts and noted what these include. Thus, the author remarks that he has frequently seen general statements of the revenue of a public supply undertaking which, upon examination, proved not to include insurance, taxes and licences, depreciation, proper cost of maintenance, legal expenses, or contingencies. It is admitted that in the United States the classification of accounts is usually a matter of individual preference; and there is no agreement on the point even among the different Commissions of one State. But the figure which the valuer wants to get at is unmistakeable. It is the actual net earnings available for the payment of dividends or interest, or both, after deducting all usual or probable expenses of every kind, character, and description. In arriving at a just determination of this amount, there is room for a considerable play of judgment, because it is not enough to find out what is actually done; what is right and proper to be done must be brought out.

In structural valuations, some valuers contend that prime cost less depreciation gives the proper value at any time; others hold that the cost of duplicating the works, less depreciation, is their value. Without criticizing either of these propositions on principle, it is objected to the former that there may be practical objections to it. The original capital outlay may have been excessive, owing to incompetent engineering or mistaken estimates of the requirements of the business. It may be difficult to ascertain the actual cost; and during construction many expenses may have been charged to the wrong account. In contrasting the two methods of valuation—capitalization of net earnings, or valuation of cost—Mr. Hill decides that probably neither is correct in all circumstances, though he admits that the former appeals more to the average financier. This is because it implicates a factor which anybody can understand—it is the purchase of a business, as compared with an investment in plant which may or may not be worth the value put upon it. In making a capitalized estimate, of course, the expert valuer must be guided to his ultimate figure by the condition of the works and plant. The problem frequently presented to the valuer is to put a fair price upon a plant in fair condition, where the working costs are excessive, yet there is a certain margin of profit. Mr. Hill begins by capitalizing the net earnings at 5 per cent., which gives the face-value of the plant. From this, he deducts the estimated cost of putting the whole thing in good modern condition, which gives the actual value of the plant. Then he capitalizes the estimated economy of working expenses due to the new plant, and adds this to the the last amount. The result is the prospective value.

This is all plain sailing so far; but there are other considerations. Mr. Hill's "Case No. 2" is as follows: "The plant may be earning money and be in such poor physical condition as to require rehabilitation in order to develop future business, to give efficient service, or the plant may be overloaded, &c. The cost of rehabilitation may be so great as to increase the fixed charges

more than the operating expenses are reduced by such rehabilitation. The condition is sometimes found where, through poor equipment, bad service, &c., a company has antagonized the public and invites competition, either municipal or private. Under such circumstances, the shrewd investor will figure on the cost of improvements which will render the service efficient, even though the cost of the service may be increased thereby, in order to render the investment more permanent. Under such conditions, we get such a statement as the following :—

Capitalization, 5 per cent. on present earnings of £10,000 a year	£200,000
Less cost of rehabilitation	70,000
Actual value	£130,000
Add increase of net earnings per annum, due to rehabilitation, £2000, which, capitalized at 5 per cent., is	40,000
Prospective value	£170,000

There is a third case, of a plant in such a poor physical state, and so badly managed, as to be losing money. Under such conditions, the face-value of the property is a minus quantity, on the principle of capitalized profits. Yet there is a value, which might be worked up into a profit with proper improvements of plant and management. These properties are often worth attention, because the owners are usually willing to part with them for a small consideration ; and if the price of gas or electricity is right, there is hope for them. Assume such a plant to be losing £2000 a year. It would cost £50,000 to rehabilitate it ; and the saving in working expenses thereby would be £6000 a year. Then the value is the capitalized amount of the saving to be effected, £120,000, less the cost of rehabilitation. A smart business man would offer about half this figure, and be willing to close for two-thirds.

As to the last consideration, Mr. Hill admits that the question of whether prospective or actual valuation shall be taken as the basis of value is largely a matter of mutual desires and reluctances. The sort of valuation he is dealing with is not the ultimate ascertainment of the actual transfer price, but a basis for a surveyor's advice to a client who has a mind to treat. Speaking generally, however, the prospective value should be the maximum ; from which it would follow that a prudent expert will always endeavour to ascertain this figure, even if he does not employ it in the first place. As regards the valuation of the numerous consolidation properties actually doing business in the States in street railways, gas, and electric lighting, Mr. Hill makes a statement which is worth knowing. It is that in such "deals" the amount of the bond issue has frequently been the equivalent of the capitalized net earnings of the concern, while an amount of capital stock has been issued, equal to or greater in amount than the bond issue, to represent the probable value of the franchise. Of course, this stock has no immediate value, and its prospective value is dependent entirely upon the increase of the worth of the franchise attributable to natural increase of population, the introduction of new manufactures, or anything that may conduce to the good fortune of the company.

The question that troubles the American municipalizer is the same that vexes the soul of his English brother ; being no more than the familiar one of how a company can be bought out to advantage. Mr. Hill somewhat sarcastically observes that the only possible object of municipalizing a public supply service is to lessen its cost to the taxpayer and citizen. "In other words, the taxpayer should become the recipient of the profits of the company in the shape of cheaper light, water, or gas." But, obviously, if the purchase is made on a capitalization of net earnings, it cannot benefit the taxpayers, who must continue to pay the same capital charges as before. This is how municipalization comes to be "as broad as it is long," where the public service is actually on a proper basis. It will show a gain in cases where the supply undertaking is on the verge of an extensive new development. After the development has taken place, purchase by a municipality becomes economically indefensible.

So much for the three phases of the question of Municipalization, which so many people talk about, and so few really understand. Mr. Hill confesses that he has only handled the dry bones of the subject, inasmuch as he does not go much farther than merely mentioning such important matters as goodwill, reserve funds, and other highly pertinent elements of value. He does deal at greater length, however, with the subject of depreciation ; and this is so very serious a topic that we shall follow him almost word by word. Depreciation, according to Mr. Hill, is "the annuity required to redeem cost of plant or renew plant at the termination of its period of useful or economic existence, usually expressed in percentage of first cost." This is a definition ; and as its author is more careful and expert than many in the choice of words to express his meaning, it is worthy of particular study. So few members of corporation committees in the United Kingdom, particularly those charged with the administration of electricity supply undertakings, know the significance of the term depreciation, that it behoves everybody who does know it to seize upon every opportunity for stating the truth of the matter in any fresh way that offers a hope of getting into the perceptions of the ignorant.

We, at any rate, intend to keep hammering away at this point, until corporation committees see the folly of carrying on electricity supply at selling rates which spell insolvency. The whole question of what is an adequate price for municipal electricity turns upon this point of allowing for depreciation. There is no need to discuss it in connection with electricity supply by private enterprise, because, as Mr. Hill shows, if a company permit their plant to fall below the normal efficiency, an impartial valuation of the property will show the fact and make the necessary deduction for the cost of rehabilitation. Consequently, if capital has disappeared, the shareholders must bear the loss. It is different in the case of municipal loans, which have to be paid all the same whether the undertaking upon which the money was spent is profitable or not ; the maintenance of the plant in a profit-earning state being a distinct matter. What we say in this regard is that if British municipalities always arranged for the payment of interest and sinking fund, and also for the maintenance of the plant in an efficient state, out of the revenue for electricity supply, it would be impossible for them to undersell electric lighting companies (as it is the boast of some to do), or to offer electricity at anything like the prices occasionally stated, and make both ends meet.

Hear what Mr. Hill has to say further about the nature of the allowance for depreciation. It is inseparable from the consideration of that important datum, "the period of economic existence" of plant. Now this period terminates at the epoch when the saving of working expenses, due to the introduction of new machinery or structures, would equal the interest on the cost of the new stuff. Where there is no depreciation fund, it is impossible to obtain this saving, except at the cost of some fresh outlay of capital, which is the reason why it is beyond the reach of undertakings carried on from hand to mouth, like most municipal electric lighting businesses. Prudent administration would make the necessary provision in advance, by paying annually out of revenue into an interest-bearing fund the proportion of money calculated to be required for the purpose. In this way, the tax upon the revenue is not so great as the actual cost of the depreciation. The fund is earning money until it is wanted. Thus : Supposing a plant costs £20,000, and is expected to last for twenty years, and that savings can be invested at 4 per cent. interest. Then, instead of having to set aside £1000 a year for depreciation, the amount will be made up by annual premiums of £671 12s. That is a simple way of putting it ; but, of course, the rate of interest obtainable fixes the amount of the annual premium.

What does not alter, in any financial circumstances, is the fact that machinery, plant, and buildings employed in a business of any kind grow old and become less profitable with the course of time. Some portions age and become unprofitable quicker than others. But they are all essentially perishable. The great truth to be borne in mind and acted upon as circumstances permit and wisdom dictates is that *provision for the preservation of the thing is not the same as arrangement for the repayment of the money it cost.* The two charges are essentially distinct. The former is the depreciation charge proper. It is, of course, something above and different from ordinary repairs. The determination of the life of different classes of plant and machinery is largely a matter of experience and judgment. In any event, the economic period should be taken as the useful life of the machinery, and not the ultimate limit of its capacity to run.

"Changes in practice in steam, electric, and hydraulic engineering frequently place limitations on the useful life of engines, pumps, generators, &c. This is particularly true of electrical apparatus." Mr. Hills schedule of depreciation allowances is, in abstract, as follows: Brick buildings, 2 per cent. ; wooden sheds, 5 per cent. ; boilers, 5 to 7 per cent. ; engines, 4 to 6 per cent. ; pumps, 3 to 10 per cent. ; condensers, 7 to 10 per cent. ; dynamos, 7 to 12 per cent. ; conduits, 3 to 5 per cent. ; and railway track, 8 to 12 per cent. Unless these provisions (or their equivalents in some form) are made in addition to the sinking fund for the redemption of their first cost, electricity generating plants big or small are not established on a permanent footing.

GAS-WORKS EMPLOYEES IN LONDON.

Results of the Census.

UNLIKE the practice adopted on taking previous censuses, when the occupations of the people of England and Wales were published in one volume, and at a late period after the enumeration, the authorities have made a new departure this decennium by publishing in county sections the results of the last census. The first occupational results to appear are those relating to the Administrative County of London, which comprises the City and the 28 Metropolitan Boroughs constituted under the London Government Act of 1899. The figures given showing the numbers engaged in gas-works on the night of the 31st of March last are as follows : Ten years of age, 2 ; 14 years, 8 ; 15 years, 344 ; 20 years, 904 ; 25 years, 2339 ; 35 years, 1945 ; 45 years, 1114 ; 55 years, 590 ; 65 years, 105 ; and 75 years, 15—total, 7366. Of these 16 are described as "employers," 7236 as "working for employers," 3 as "working on own account," 111 as "others—or no statement." Comparing the above total with that of the census of 1891, we find the number of persons engaged in the gas-works at that time in the County of London to have been 5776. Thus the increase in the decennial period amounts to 1590. There was no distribution in counties at the last census under the headings of "Employers," &c., nor was there any distribution of occupations under

age periods, as at the recent census. No comparisons are therefore available in these connections. It may be mentioned that at the census of last year, two persons engaged in gas-works are described as "deaf and dumb," and one as "blind." We purpose, from time to time, as the figures become available, publishing those for the remaining counties. We understand that the next county to be dealt with by the authorities will be Lancashire.

ELECTRIC LIGHTING MEMORANDA.

Unfair Statements of the Cost of Arc Lighting—How the Delusion is Created and Spread—More Electric Power-in-Bulk Schemes—Their Futility.

A CORRESPONDENT calls our attention to what he rightly stigmatizes as the unfair way in which some individuals who call themselves electricians commend electric lighting to uninstructed persons, such as most members of local authorities and many factory owners, as being far cheaper than it is. The comparison of arc lights, for instance, with any other means of lighting which entails the consumption of the illuminant, is easily misstated, without the fallacy appearing on the surface. When a certain definite quantity of gas, or oil, disappears within a given time to make a light, there is no possibility of mistaking the most considerable source of expense. In the case of arc lighting, the opposite condition prevails. The chief expenses are not apparent. Consequently, it is the habit of the lower order of electrical touts to put the cost of arc lamps at some ridiculously low figure, made up of an imaginary estimate of the cost of the coal consumption, and adding the cost of the carbon. Our correspondent declares positively that the manager of a large and well-known firm—he does not state in what line of business—assured him personally that their electric arc lamps only cost ¾d. each per hour. The figure was supplied by the "electrician," and was based on the supposititious consumption of 1 lb. of coal per hour to generate the current, and ½d. for the carbon. This was maintained to be a fair representation of the cost of the light.

One can easily see how this illusion is created. Given a factory with a sufficiency of power, especially if there is electricity also on the spot for power purposes, and it is easy to persuade those who wish to believe it, that the cost of adding a few score of arc lamps is nothing more than the actual proportionate expense of the extra coal burnt and the carbons consumed. Then, of course, it is a simple matter to take a fancy figure for the coal, and the cost of the carbons is an inconsiderable trifle. Seeing how few factory owners have a correct knowledge of what their power costs them altogether, it is no wonder that they can persuade themselves that a few arc lamps more or less make no difference to the working costs of the factory. The only people, it can truly be said, who know what arc lighting costs are the electric lighting companies who have contracts for doing it; and they are not as a rule anxious to take such contracts except at prices which are not freely advertised. One bad result of the self-deception of private firms doing their own arc lighting is that the illusion spreads outside, and deceives the public lighting authorities. Sometimes it is the manufacturer himself who is on the corporation or the district council, and he tells what he thinks he knows on the subject. So the evil gets disseminated, until the ratepayers are involved in an expenditure for electric lighting which, with fuller knowledge, their representatives would have spared them.

There are several electric power-in-bulk-generation schemes in Parliament this year, which are bound to attract the favourable notice of the newspaper writers who, when no other topic offers, are fond of clamouring that "science" should utilize the wasted power of the tides, of the winds, or the waves of the sea, in order to provide light, heat, and power throughout the United Kingdom. Not that any of these projects proposes to do anything so interesting as this; but they are all for the generation and supply over extensive areas of electricity in large quantities, and that is enough to recommend them to the ordinary newspaper writer and reader. Some of the Bills of this class emanate from speculators who have no standing in the country at all, and whose names crop up as "first directors" of several of the proposed companies seeking territorial powers for regions widely apart. This is always the case with popular "movements" that offer the chance of a "lift" to anyone who can jump up while they pass. Notwithstanding all that is said of the vexatious character and expense of Private Bill procedure, such considerations never hinder the promotion of catchpenny Bills. There are a few examples of Bills for sanctioning better-considered electric power schemes, but all lie under the imputation of being premature.

It should be time enough to talk of more electric power-in-bulk schemes when those already authorized have not only made a start, but are achieving results. Actually, there are scarcely any doing one or the other. The whole case for the expediency of ventures of this kind is still presumptive. It is understood that capital is not readily forthcoming for the carrying out of the existing Acts; and what can be the justification for passing more Acts of the same character must be matter for conjecture. It is to be supposed that those who were first in the field for this imaginary gold mine picked out the likeliest spots to commence operations; and if the various manufacturing districts already appropriated by enterprising "bulk" electricians remain yet unsupplied, it is a stretch of credulity to suppose that the rural districts of Kent and Warwickshire are likely to get it first. There is not a single "bulk" company's stock mentioned in the market quotations published by the electrical journals. While this observation holds good, it seems waste of effort, time, and money to add to the number of those statutory electric power companies which seem to be addled in the nest.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 367.)

BUSINESS on the Stock Exchange last week was on rather a lower scale than in the week before. Some interruption at the opening was caused by damaged wire communications owing to the storm. But though the volume of transactions taken all round the departments was reduced, the general tendency was fair and steady. Prices were for the most part better, except in Rails, which were affected by disappointing dividend results. The reduction of the Bank rate on Thursday to 3 per cent., from the 3½ per cent. rate to which it had been lowered a fortnight previously, had an invigorating effect. The Funds had a substantial advance; and the gilt-edged division in general throve. In the Money Market, there was a pretty good demand; and the supply was ample to meet all requirements. In the Gas Market, business was somewhat irregular—promising to be active on some days, and then falling quite quiet the next. Transactions were not so much restricted to a few leading issues as has sometimes been the case, but were more evenly distributed among the less-dealt-in stocks. But with all this, changes in quotation almost reached the irreducible minimum; being two only, whereof one was up and the other down. The general tone, however, was firm. In Gaslight issues, the ordinary was moderately dealt in at figures which fluctuated but little all through the week. The opening price was 98¼, and the closing mark was 98. Thus far it would appear that holders are satisfied with the position and prospects of the Company, as indicated in the printed accounts and the official utterances at Friday's meeting. The secured issues were fairly firm, and the debenture advanced a point. South Metropolitan was weaker; some disappointment being felt that a portion at least of the increased dividend authorized by the reduction in the price of gas was not to be given to the proprietors. On the opening day, 128½ was marked, and on Friday 126⅛ was touched; but the closing figures were 127½. Very little was done in Commercials; but the prices were firm. A little business was marked in the Suburban and Provincial group; but there was nothing remarkable about it. The Continental Companies were very quiet, and a trifle inclined to droop for lack of support; but there was no actual fall. Among the remoter undertakings, Buenos Ayres was conspicuous for activity, and made a good bid for an advance, but could not quite succeed. The Water Market was fairly active, and the whole list had another good "boom." But the rise in one or two instances was a little overdone; and the quotations had to go back a bit. Prices are very wide; and it is a toss-up which way they will go next.

The daily operations were: Gas was quiet on Monday. Gaslight debenture rose 1. In Water, the two Lambeths gained 10 and 5½; the two Southwarks 6 and 7½; New River and West Middlesex 5; East London and Chelsea 3; the two Kents 2½; and Grand Junction 2. Gas did not move on Tuesday; but in Water, Chelsea rose 7½, East London 7, both Kents 5, and Grand Junction 2. On Wednesday, Gas was more active. South Metropolitan fell 1. In Water, Chelsea preference rose 3, and Southwark preference 2. On Thursday, Gas was very quiet and unchanged. In Water, East London receded 2, and Lambeth 2½. Gas was still quiet on Friday; and South Metropolitan fell 1 more. In Water, East London debenture rose 1. Saturday was quiet and unchanged.

Award of Premiums by the Society of Engineers.—At the meeting of the Society of Engineers on Monday of last week, the following premiums awarded by the Society for papers read during the past year were presented by the retiring President (Mr. Charles Mason): The President's Gold Medal to Mr. H. A. Roechling, for his paper on "The Sewage Question during the Last Century;" the Bessemer premium of books to Mr. R. G. Hetherington, for his paper on "The Main Drainage of Ilford;" a Society's premium of books to Mr. A. T. Allen, for his paper on "Concrete Subways for Underground Pipes;" a Society's premium of books to Mr. S. A. Hollis, for his paper on "Preliminary Investigation for Water Supply;" and a Society's premium of books to Mr. J. F. Stow, for his paper on "Irrigation Works in South Africa."

The Coal Resources of India.—Under the auspices of the India Section of the Society of Arts, a paper on the above subject was read last Thursday by Professor Dunstan, F.R.S. He said India possessed a practically inexhaustible supply of coal—the output in 1900 being 6,000,000 tons. The exports had risen from 15,620 tons in 1892 to 541,445 tons in 1900. As a rule, Indian coal afforded more ash than the best European; and its calorific power was usually somewhat lower. Taking into account all its defects, it was from 17 to 20 per cent. inferior to the average British coal of the same type. The future success of Indian coal mining depended chiefly on native labour being well organized. Next in importance were the questions of railway rates, transport, and dock accommodation, all of which were receiving the serious consideration of the Government.

MAINTAINING INCANDESCENT GAS-BURNERS.

THE old tale, that gas consumers resent suggestion by gas suppliers, and regard an interest by them in the welfare of their gas-fitting arrangements as suspicious and an undue interference, must now be dropped as being not altogether in accord with fact. The present-day desire for improved lighting, and more directly the gas-stove hire and prepayment meter systems, have brought in their train a more intimate relationship between gas suppliers and consumers, and that relationship it is well to drive to its utmost reasonable length. One way in which a further step can be made to this end is by the adoption of the system of maintaining incandescent burners. Several gas companies have already taken action in this direction, and with success. When we say "success," we do not mean so much in regard to monetary profit, as success from the profit derived by the company in getting on a more friendly footing with consumers, and, by keeping "lamps" properly "trimmed," helping to ensure contentment.

If the people of provincial towns are anything like in disposition many of those residing in the suburbs of London, then we have confidence in saying that every town contains a number of gas consumers who would like more light, and would willingly adopt incandescent gas-burners to get it, but—and here is the stumbling-block—the burners require attention, and so are blackballed on the ground that they are a "nuisance." The little trouble required in keeping them in order is irksome to most consumers; and experience proves that there are many existing users and would-be users who would willingly pay a small fee to someone who would relieve them of anxiety in this regard. At present "the trade" does something in the way of maintenance in the suburbs and provincial towns; but it seems to us that the gas companies who have already business connections with the consumers are the best people to successfully undertake the work. They have a direct interest in its proper performance; and it will pay them even if the income only covers expenses. So at least those gas suppliers find who have thus far undertaken the work. When there is a cheapening of incandescent mantles, this maintenance system will, if we mistake not, become quite an important institution in all progressive gas undertakings.

There are, of course, a good many details to be considered in connection with the adoption of the system. There is the price to be charged for the service, the intervals between periodical visits, the number of men required for the work, and a score or more little points which must be determined with due regard to local circumstances. It may serve as a guide to those contemplating adopting the system to know what the Welsbach Company have done in London in connection with this maintenance work, but, of course, a gas company or authority will not be so favourably situated as the Welsbach Company in respect of maintenance outlay; and so they may not be able to give quite such frequent attention to consumers' burners. The Welsbach Company, we learn, employ at the present time about fifty men in their maintenance department; and they have in London 1300 gas consumers as clients, having between them 27,000 burners needing upkeep. The last figure is an increase of 6000 during the past year. Now the Company's charge for the service is 6d. a burner per month for inside or outside lights, except the extra sized burners (No. 7), which cost 1s. a month. A discount is allowed off these charges to large users as follows: A minimum of 25 lights, 5 per cent.; 50 lights, 10 per cent.; 100 lights, 15 per cent. Of course, the Company's men inspect—and this is important—the fittings and burners before taking on a maintenance customer, in order to ascertain that they are in good working condition; and then, if satisfactory, for 6d. a month a man is sent every week (oftener if necessary) to inspect, clean, and regulate all the burners, and replace with new mantles and chimneys such as may be required. The rate of mantle usage is found to work out to an average of about 4 per burner per annum. The Company do not replace, except at the usual price, mantles, globes, or chimneys broken or damaged by accident (unless by their own employees), or by any other cause than reasonable wear and tear. Another condition is that they will not undertake to maintain less than three burners, nor for a less period than three months; nor, again, will they undertake to maintain a portion of an installation—that is to say, they undertake to maintain all incandescent burners that may be fitted inside or outside the consumer's premises, or none at all. If this condition is not made, it will be readily seen how easily the Company might be cheated by unscrupulous consumers changing their mantles and chimneys. Payments have also to be discharged in advance. For the consumers, the maintenance system possesses several advantages: They have no worry or trouble with the light; their burners and mantles are kept in a high state of efficiency; they get a perfect light; and consequently the greatest benefit in the way of economy and excellence in illuminating power. Directors and managers who have not already done so, will certainly do well to consider the adoption of a system of incandescent gas-burner maintenance on their own account. It will pay indirectly, if not directly.

Rust-Preventing Paints.—This subject was dealt with in the "Zeitschrift für angewandte Chemie" for the 14th ult. by M. Andès. He exposed a large number of paints to five different tests—viz., weather, water, salt solution, dilute hydrochloric acid, and sulphate of copper solution, and gives details of the results.

THE MASSACHUSETTS BOARD OF HEALTH.

IT is scarcely necessary to recall to the recollection of those of our readers who are specially interested in water supply, the various occasions on which the formation of a special Department of State to deal with all questions relating to public health has been advocated. Whenever the subject has been under consideration, approving reference has generally been made to the work of the Massachusetts State Board of Health, the nature and extent of which are duly set forth in annual volumes similar to those of our Local Government Board. Unfortunately, like the Blue-books relating to the Whitehall Department, they are rather late in making their appearance—a delay which is possibly excusable on account of the mass of tabular matter they contain. Though this detracts somewhat from their value, they still retain their worth as books of reference. As the question above alluded to may possibly be revived during the current year, we give a few particulars from the last report to hand of the Massachusetts Board. It is a volume of 864 pages, and furnishes an excellent account of their labours, as far as our readers are concerned, in the twelve months ending Sept. 30, 1900.

The regular work of the Board is performed mainly under the provisions of three separate Acts—one passed in 1869 to establish the Board; another in 1882, providing for the inspection of food and drugs; and the third in 1886, to protect the purity of inland waters—together with certain amending Acts. The branch of the Board's work relating to water supply and sewerage was carried on, as in previous years, under the direction of the Engineer (Mr. X. H. Goodnough). In the period covered by the report, 104 applications were made to the Board for advice with reference to water supply, sewerage, and the prevention of the pollution of streams. The number was larger than in any preceding year—in fact, about twice as many as were presented to the Board for consideration in any year prior to 1896. Public inquiries were held in connection with these applications; and an abstract of the decisions thereon is given in the report. The various water supplies in the State were examined from time to time—the tabulated chemical and microscopical results occupying no less than 238 pages. At the end of the Board's year, 116 cities and towns were provided with public water supplies—166 being served from their own works, and 50 from private companies. The total population of these places, according to the census of 1900 (the last available), was 2,565,301, or 91·4 per cent. of the total population of the State. The number of people living in the places supplied by private companies was 237,917, or about 9·3 of the total in all the cities and towns served.

It is interesting to note that while the growth of population in the State in recent years has, generally speaking, been rapid, the increase in the consumption of water has been even more so; and the Board are of opinion that the limit has not been reached. The old practice of charging upon the number and nature of the fittings, or in certain cases upon the value of the buildings, is being abandoned in favour of supplying large consumers by meter, and charging a fixed rate in proportion to the quantity used. Where records of the water pumped are kept, a comparison of them with the sales by measure shows a large difference—in fact, in some cases the latter is only about half as much as the former. Errors in measurement may account for much of this discrepancy; but it is more probably due to excessive loss by leakage. The effect of introducing the meter system was, in the first instance, to check the increase in consumption in many cases. Coincidently, however, with the movement to reduce the consumption from public works by some more exact method of distribution, there has been a marked increase in the number of private water supplies in the State.

Having given an indication of the nature and extent of the Board's work in connection with the distribution of water, it will be of interest to see what they have to say in regard to its sources. It appears that the flow of streams in the year covered by their report was very greatly in excess of the normal during February, March, and May; but in all the remaining months it was less. During the summer it became very low, especially in August and the early part of September. Numerous samples of water from various points on the more important streams were analyzed, as in previous years, and the results are fully tabulated. In the report for 1899, reference was made to several streams which were found to be highly polluted; and it is regrettable to learn that "no material change has been made in their condition"—in fact, in one case (the Neponset River) it was actually worse. About eleven years ago, an examination was made by the Board of the spring waters offered for sale in the State. The number then was 45; whereas in the year 1889-1900 it was 99. Rather more than 6 million gallons of this water are now supplied per annum. Originally, it was tested at the source only; but in recent years samples have been taken at, or on the way to, the point of delivery. The results show, speaking generally, a deterioration in quality due in some instances to the presence of a mineral ingredient. Unfortunately, this is not the extent of the revelation. In many cases a notable increase is reported in the number of bacteria in the water as delivered, compared with that found at the source; and this is pointed to by the Board as "an indication of lack of care and cleanliness in its collection and distribution." At the same time, they acknowledge that a large number of the spring waters are of high purity, though no purer than the water of the best of the public supplies of the State taken

from "ground sources," which possess the additional advantage that they are "far less liable to become seriously polluted before reaching the consumer than are the spring waters."

While on the subject of the purity of water, opportunity may be taken for mentioning that the investigations with regard to the removal of bacteria by sand filters and by the Lawrence city filter have been continued by the Biologist (Mr. Stephen De M. Gage) at the world-renowned experimental station at that place. Important studies have also been made upon the removal of colour, taste, and odour from natural waters. The investigations commenced some time ago into the action of water upon metallic service-pipes have been continued, and the results are presented by the Board's Chemist (Mr. H. W. Clark) and his Assistant (Mr. F. B. Forbes), together with a study of the methods employed for the separation and determination of the various metals found in the water taken from such pipes. Opportunity may be afforded for reverting to these matters on a future occasion.

WATER BILLS FOR 1902.

(*Continued from p. 270.*)

THE Abertillery Urban District Council Bill contains a part relating to water. An additional reservoir is to be constructed, to be formed by an embankment across the Tillery Brook above the Cwmtillery reservoir. The land is to be purchased within five years, and the works constructed within seven years. The existing requirements as to compensation water are not to be altered. Sums of £35,000 are required to be borrowed for the construction of the proposed reservoir, £10,500 for the completion of works authorized by the Act of 1894, £5000 for improvements and general purposes, and £2281 for mains.

The Bedford Corporation Water Bill recites that new and additional water-works are needed for the supply of the borough, estimated to cost £105,000. The source of the new supply is to be a well and pumping-station at Henlow, and a reservoir is to be constructed on Hammer Hill. The necessary land is to be acquired within seven years, and the works finished within ten years. Rates for domestic supplies are to be based on a uniform charge of 7 per cent. A supply for domestic purposes is not to include "swimming baths, stables, lawns, grass plots, and garden purposes." A clause is inserted proposing that a maximum quantity may be prescribed for metered supplies, with a surcharge for any excess taken.

The Birkenhead Corporation Bill proposes to extend the time allotted for the completion of certain water-works to Jan. 1, 1907. The additional sum of £30,000 is required for water-works purposes. Power is sought for the issue of Corporation bills.

The Birmingham Corporation Water Bill is to extend the time prescribed by the Act of 1892 for the completion of certain works now in progress, but which cannot be finished within the allotted time. A number of road diversions in the counties of Radnor and Brecknock are proposed, to be completed within seven years. Additional powers are required for preventing contamination of the watersheds. With this object, 500 acres of land are to be purchased. It is desired to pay interest out of capital loans for ten years from the passing of the Act.

The Bradford Corporation Bill contains a part relating to water. Additional works are to be sanctioned, including service reservoirs on Hartshead Moor Top, in the parish of Clifton; another on Owlcotes Hill, in the parish of Pudsey; and a third at Calonley. An additional water-works loan of £84,800 is required, repayable in sixty years.

The Buxton Urban District Council Bill is to empower the Urban District Council to construct additional water-works, at an estimated cost of £171,000. The land is to be acquired compulsorily within seven years; and the works completed without limit of time. Two reservoirs are to be constructed on a portion of Stanley Moor, near the Buxton and High Peak line of the London and North-Western Railway. The water supplied from this source is to be treated for the prevention of plumbism. The domestic water-rate is to be 10 per cent. An agreement between the Council and the Duke of Devonshire is scheduled for confirmation.

The Darley Dale Water Bill is to authorize the Urban District Council to enlarge their water-works, at an estimated cost of £25,000. Wells, and a weir and collecting tank are to be constructed in the parish, for the appropriation of ground water. The works are to be completed in seven years. Rates for domestic supplies are to be 8 and 7 per cent., under and above £30. Domestic supplies are not to include swimming baths, stables, or garden purposes. The maximum price for metered supplies is to be 2s. per 1000 gallons.

The Halifax Corporation Bill contains a part relating to water. It is proposed that the discharge of compensation water from the Warley River Reservoir under the Act of 1853 shall be altered from $5\frac{1}{3}$ cubic feet per second during twelve hours of every working day to 2·27 cubic feet per second, to be discharged in a regular and continuous flow. Similarly the discharge of compensation water from the Widdop Reservoir is to be changed from 6 cubic feet per second for twelve hours to 2·556 cubic feet per second regularly and continuously. Except with certain contracts existing at the passing of the Act of 1876, the Corporation desire power to restrict the supply in times of great drought or under other exceptional circumstances. The sum of £40,000 is required for the purchase of drainage areas.

The Huddersfield Corporation Bill contains clauses reviving the powers of the Corporation to make and maintain the Butterley and Blakeley Reservoirs and the Shepley tank. Both reservoirs are for impounding the waters of the Wessenden Brook. New works are to be constructed, including a catchwater drain at Marsden, to connect the existing bye-wash of the Wessenden Head reservoir with the existing Deer Hill reservoir catchwater authorized by the Act of 1869. The works are to be completed within ten years. Stringent provisions are inserted as to compensation water, and with regard to testing the tightness of the reservoirs. Supplies may be restricted in times of unusual drought or under other exceptional circumstances, provided that all consumers are treated alike. The rates for domestic supplies are to be based in all cases on the gross annual value of the property as assessed to the poor rate. Agreements may be entered into for restricting the compensation water in times of drought. The sum of £175,000 is to be borrowed for revived and authorized water-works purposes, with such further sums as may be requisite to pay the interest on the cost of the reservoirs named, from July 25, 1900.

The Knaresborough Improvement Bill has a part relating to water. The district of supply of the Council is to be extended to include the parishes of Scriven and Knaresborough Outer. The rates for domestic supplies are to be from 8 to 7 per cent., under and above £30.

The Liverpool Corporation Bill is to enable the Corporation to acquire lands for the protection of the drainage area of the Rivington Water-Works. Certain clauses of the existing Acts are to be repealed.

The Margate Corporation Water Bill is to extend the limits of supply beyond the added district of 1900, subject to the obligation to sell outlying portions of the undertaking to the local authorities interested. Additional works are to be made, including a pumping-station at Wingham. The works are to be completed within seven years. Highway authorities outside the borough may repair the roads broken up by the Corporation at their expense. Parts of the Canterbury Gas and Water Act of 1866, the East Kent District Water Act of 1889, and the Mid-Kent Water Act of 1900 are to be repealed to make way for this Bill. The sum of £90,000 is to be borrowed for constructing the contemplated works, and £30,000 for general water-works purposes.

The Menai Bridge Urban District Bill is to authorize the District Council to enlarge their water-works, at an estimated cost of £2500. The district of supply is to include the parish of Llansadwm. The source of supply is to be an impounded pool on the stream called Afon Rhyd Eilian, and the water is to be lifted by a hydraulic ram. The rate for domestic supplies is to be 10 per cent.

The Newport Corporation Bill is to enable the Corporation to borrow £150,000 for water-works purposes and to extend the time assigned by the Act of 1897 for the completion of certain works for a period of three years from Aug. 6, 1903. The construction of a particular aqueduct, not in accordance with the enabling Act, is to be confirmed.

The Nottingham Corporation Bill contains a part relating to the construction of new and additional works. The limits of supply are to be enlarged to include the parish of South Wilford. Two covered service reservoirs are to be constructed, at Watnall and Wilford, to be completed within seven years. The sum of £33,300 is required for water-works purposes.

The Rhondda Urban District Council Bill refers, in part, to water. It proposes the construction of a well and pumping-station in the parish of Ystradyfodwg, to be completed within seven years. The period for the completion of certain authorized works is to be extended. The sum of £51,000 is required for water-works purposes, repayable in 45 years.

The Swansea Corporation Water Bill is to extend for another five years the time limited by the Act of 1892 for the completion of works. The sum of £71,000 is to be borrowed for general water-works purposes.

The West Gloucestershire Water Bill is to extend the limits of supply of the West Gloucestershire Water Company to include the parishes and places of Acton, Turville, Alderley, Great Badminton, and Tormarton, in the rural district of Chipping Sodbury, and Didmarton in the rural district of Tetbury. The supply is to be made effective in five years. Additional capital is required to the amount of £60,000, to bear 7 per cent. ordinary or 5 per cent. preference dividend; but not more than one-half of it is to be issued as preference capital. Borrowing powers to the extent of one-fourth of the share issue are asked for, with the usual sanction for the creation and issue of debenture stock.

The Wolverhampton Corporation Water Bill is to enable the Corporation to make additional wells in the parish of Worfield, and reservoirs at Tettenhall and Sedgley. A tramroad is also to be made for the service of the pumping-station at Cosford. Certain provisions are inserted for the protection of the owners of private wells. Several District Councils may require a supply in bulk. Additional water-works capital to the amount of £250,000 is required.

We learn from Mr. A. Cooke, of Oldbury, the Hon. Secretary of the Midland Association of Gas Managers, that the annual meeting will be held at the Grand Hotel, Birmingham, on the 27th inst. It may be remembered that Mr. Charles Hunt is President for the year; and consequently an interesting Inaugural Address may be expected.

COMMUNICATED ARTICLES.

CRITICISMS ON CONSTRUCTION OF COAL AND COKE HANDLING PLANT AT ZURICH GAS-WORKS.

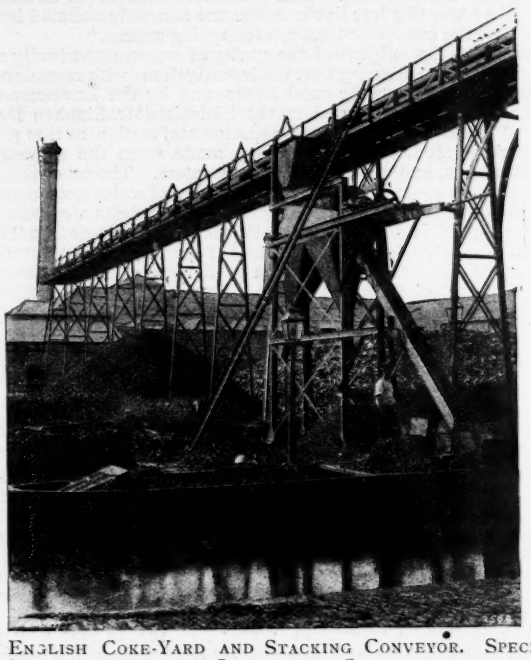
By Archibald Little.

(*Continued from p.* 275.)

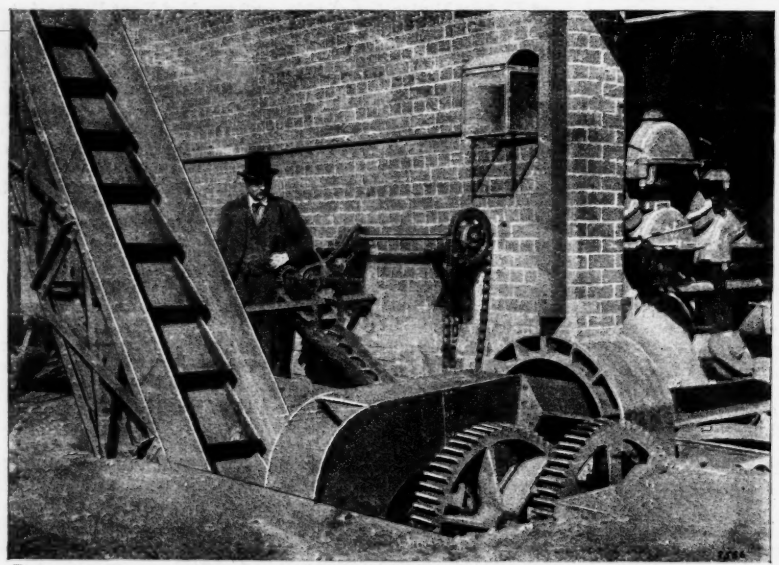
Proceeding to the coke plant, I will not go into the question of the storing of large quantities in covered buildings, as this method is never resorted to in this country; open coke yards being the rule. However, the deterioration which Herr Weiss mentions is worthy of consideration if large stocks are kept. The truck form of transporter, I believe, works very well, especially at Glasgow, where the means of transport is by steam locomotives. But the labour charge is high; and the wear and tear must be nearly as great as with conveyors. It appears that the large hopper in front of each bed is unnecessary, as deflecting-plates would have been quite as serviceable and less costly, as has been proved at Middleton and Cambridge.

The trucks have all to be wheeled by hand from the retort-house to one spot in the coke-house; and this in some cases necessitates a travelling distance of at least 500 feet; and to deal with the quantity specified—*i.e.* 20 tons per hour, it is necessary with waggons holding say 5 cwt., to make eighty journeys per hour. This must require a great deal of labour, and would be very severe work in winter time. The plant is not illustrated in detail; but it is understood that the whole of the coke from the four benches of retorts is delivered, by the trucks or by the De Brouwer conveyor, to the one elevator in the coke-house.

On two of the benches, the De Brouwer conveyor is used; and I must say it will be difficult to convince me of the utility of this contrivance. The principle of the conveyor is to make all the moving parts light, to cheapen and facilitate renewals. Take the chains for example. Mr. Forgie (of Messrs. W. Baird and Co.) has laid it down that a double strand of chains will never prove the correct principle for a hot-coke conveyor, as they do not stretch equally, as anybody who has seen them at work can tell. Those in use are too short in pitch, and far too light, of a very poor design, being in five parts to the foot, with $\frac{5}{16}$-inch connecting rivets. The coke is scraped along in a shallow trough, the chain sliding on angle-irons forming part of the trough; and the wear, both on the chains and angles, is excessive. The cross-bars are too light, and are continually bending and pulling out, especially when the rivet-ends wear out, through rubbing on angles owing to the side motion of the chains in the trough. My experience is that the chains have to be repaired every day and renewed every few months. The coke is very much broken and worn, causing a large percentage of breeze, and reducing the selling price. The bottom of the trough is very quickly impaired; and, in fact, a false bottom has been found necessary, which buckles with the heat. It is, of course, an easy thing to condemn, and a very difficult thing to create; but it happens that, in this instance, experience has enabled a better principle to be designed—the idea being to carry the coke, and not to scrape it.

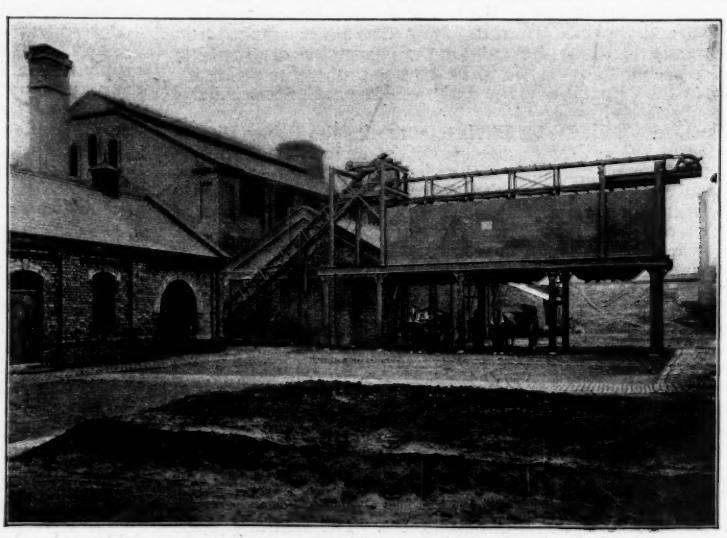


An English Coke-Yard and Stacking Conveyor. Special Shoots are used to Lower the Coke, and obviate Breakage.



Delivery End of Hot-Coke Conveyor, showing Elevator. Fall from One to the Other, less than 18 inches.

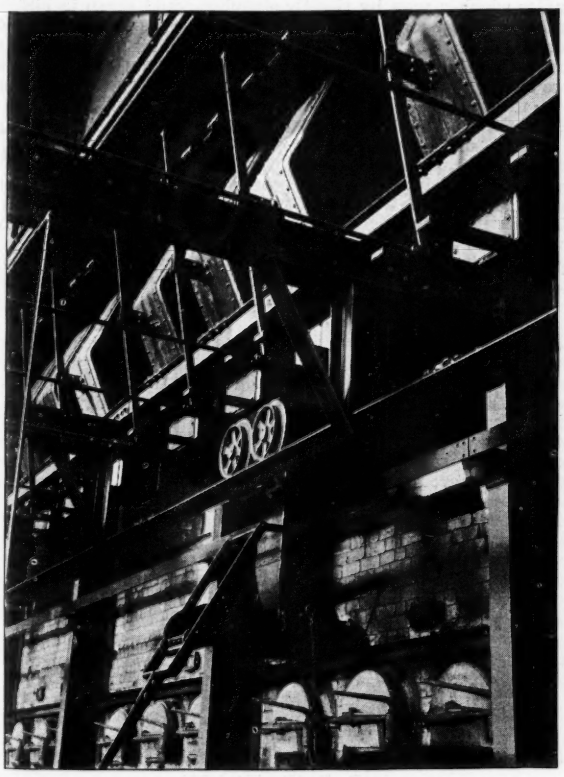
In a number of gas-works in this country, the patent tray-plate pattern of conveyor is now at work; the design being as follows: A 12-inch pitch single chain 4 inches wide, $2\frac{1}{2}$ inches deep, with $1\frac{1}{4}$-inch steel pins, has riveted to it a continuous line of 18 inches wide $\frac{3}{16}$-inch plates, each joggled down at one end, and being overlapped $1\frac{1}{2}$ inches by the opposite end of the succeeding plate, to keep the breeze from the chain. On every third plate on each side of the chain is fixed a cast-iron bracket, with a 3-inch flat face, extending down to within $\frac{1}{16}$ inch of the bottom of the trough, to scrape away any breeze or dirt which may be washed down. Between the side plates of the brackets, which form a bearing for a $\frac{1}{2}$-inch pin, and behind the face, are fixed $1\frac{1}{4}$-inch wide rollers, which carry the top strand of the chain, and run along the bottom of the trough. These rollers are removable from the bracket, the bracket detachable from the plate, and the latter is easily renewed when necessary without disturbing the chain. The whole weight is carried on the rollers. No part of the machine is in sliding contact; and the coke itself is carried, and in such a



Outside Coke Plant at Leigh, Lancs.

position that it cannot get on the chain or rollers. Consequently but little power is required for driving; 3-horse power being sufficient for 360 feet, carrying 20 tons per hour. The reduction in power ensures smooth work, and little friction. There is so little noise that one cannot tell, by the noise, when standing near the conveyor, whether it is working or not. At first, the trough was made in cast iron, in 6 and 8 feet lengths; but this soon caused numerous joints and the castings cracked, through contraction after heating and subsequent cooling. The latest design is made with splay channels 12 inches deep; the bottom flanges having riveted thereto a ⅜-inch bottom plate 24 inches wide, the connection being water-tight. Being constructed in 20-feet lengths, there are fewer joints, and these are made quite tight. The framework to carry the return chain is so designed that it can be fixed prior to, and independent of, the trough, so that one length of the latter can be taken out without disturbing the chain or the rest of the ironwork. Cross joists carry vertical hanging angle-irons, which are riveted to longitudinal angle-irons, fitted with bearings every 6 feet, in which revolve spindles, having two 6-inch diameter by 1½-inch turned rollers cast on, and on these the return plates are supported.

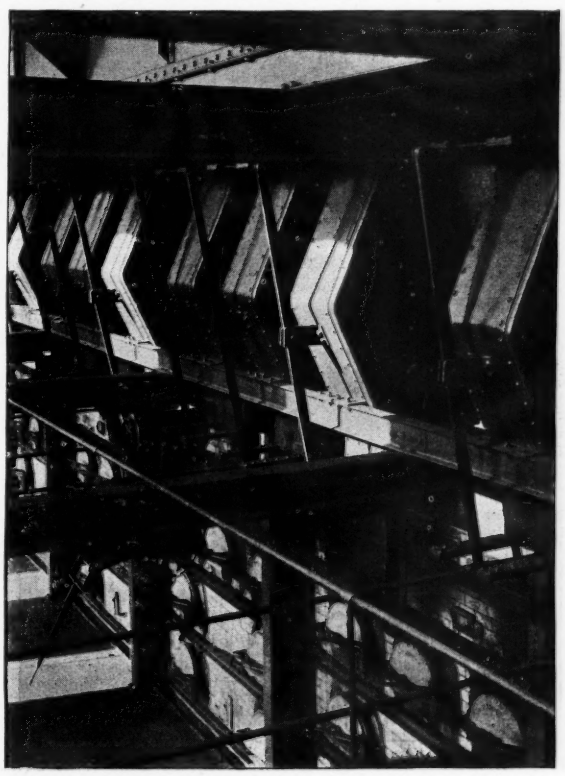
I suggest that at Schlieren one of these conveyors could have been put in front of each bench, delivering to cross conveyors fixed between the two end benches and those next to them. These in turn would locate the coke to two longitudinal steel tray conveyors, fixed in the centre of one bay in the coke-house. The arrangemement of coke plant in the stores is, to say the



Shot-Pouch Charging Appliances, viewed from Charging-stage, showing Retort Bracing.

least, not the best that could have been designed. The description has it that the "large or broken coke"—whatever that may mean (see "Journal," Jan. 8, 1901, p. 81)—falls directly into the railway waggons and into the conveying plant. Now, from the end of the jigging screen, which receives the coke from the elevator, there is a drop of 16 ft. 8 in. to the bottom of the trough, which will simply pulverize the coke on impact; and as there is no storage hopper, the truck will have to be in position when the elevator is working, and will require moving so as to keep the empty part always below the shoot. In the indicated position of the shoot, a man will have to be constantly in the truck while loading, to spread the coke over the waggon and fill it. Then he will have to come out while the truck is being weighed, or his own weight will have to be deducted from the register. In that case, every new man put on for this job will have to make his weight known to the machine man, or something amusing in the way of conversation would ensue. In any case, there will be one man to remove the trucks, and another to fill them. The weigher is immediately on one side of the coke-breaker, which is at the elevator head, so I should like to know, when the truck is filled, being weighed and shifted, where the coke is going which is still being delivered from the screen? Is it meanwhile diverted to the longitudinal conveyor? Is the plant temporarily set at rest till another truck is in position? How are the trucks moved? Certainly, not by an engine, because one cannot accurately weigh a truck that is coupled up. If the surplus coke is put on one of the conveyors which, I understand, transport the coke to the right and left of the elevator longitudinally along the house, is it then dropped into waggons on the same line? as if so the task of weighing these trucks, and also the ones fed direct from the elevator would make "confusion worse confounded." Why is the longitudinal conveyor composed of three separate parts? Why, it may also be pertinently asked, is it stated that "a single apparatus, in fact, is used for both conveying and heaping the coke in the house?" especially considering that, in addition to the three-part longitudinal conveyor, there is a traversing cross conveyor (fig. 8), mounted on a huge lattice girder, and running up and down the coke-store on heavy upright lattice girders and rails. This conveyor, I assume, is moved along as the store is filled, and can receive the coke from the longitudinal conveyor, at any point in the latter's length. It will be noticed that all the good the traversing conveyors can do is to fill a space 42 ft. wide by 11 ft. deep, multiplied by the length of its travel, and that only with about as much labour as, and more cost than, could be done with hand labour.

The statement is made ("Journal," Jan. 8, 1901, p. 81) that "according to our experience the extent of wear and tear between these two materials (coal and coke) is in the proportion of from 1 to 10 to 1 to 20" (!) Doubtless it is, on the form of conveyor used; but I can point to a plant put up in 1892 for Mr. T. Bower, of West Hartlepool, which is still working very satisfactorily with most of the original parts still in use—the chains and wheels only



Shot-Pouch Chambers and Back of Bench, showing Superstructure.

having been renewed. Another plant worked by Mr. J. Foster, at Leigh, Lancs., and shown on photograph, was put up in 1892; and all the replace parts supplied amount to only about £4. Taking the life of a coal plant at 20 years, these coke plants should, on the above estimate, have worked one or two years, or, with a very large upkeep expenditure, they might have lasted four years. Conclusions are obvious.

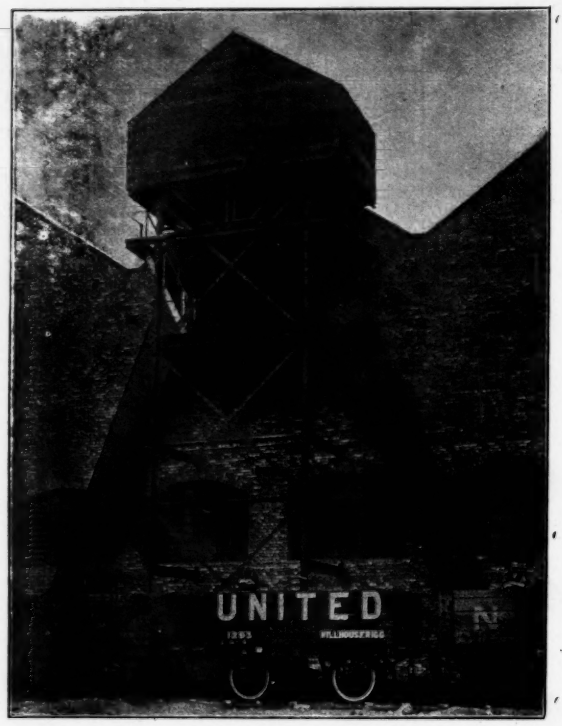
Professor Stodola is reported as stating that the De Brouwer system allows the coke to be elevated without difficulty by an inclined trough, which offers the great advantage of doing away with the elevator buckets, which are certain always to produce wasteful crumbling of the material. In answer to this, I say that nearly every De Brouwer system at work in this country has an elevator besides a conveyor—witness the Crystal Palace and Newcastle installations; and Saltley has an Armstrong hydraulic crane. Further, the De Brouwer conveyor breaks the coke at least as much by scraping as the buckets do by carrying, and always in a greater degree when the latter are properly designed. Take the Schlieren plant, and see if there is likely to be any breakage. Notwithstanding Professor Stodola's tirade against the poor elevator, the authorities have adopted one to lift coke from the trucks to the screen. The drop from the buckets to the screen scales about 5 feet, first break; from screen to truck there is a vertical fall of 16 ft. 8 in., second break; from the longitudinal conveyor to the store 20 feet (right across the rails), or from the first to the second conveyor 4 feet, and thence to the ground

16 ft. 8 in. It is impossible to completely criticize the system with the meagre description and one drawing; but perhaps some further information will now be submitted, so that this part of the plant can be thoroughly dealt with.

Proceeding now to discuss the benches of retorts, Herr Weiss speaks of his arrangement being on the Coze system of inclined retorts; but there is really no such thing. Several gentlemen claim that they originated the principle of setting retorts on the slope. But the honour of adopting scientific arrangements to make the idea successful, rests with a few British gas engineers, who had the courage of conviction to try the plan; and no small credit attaches to the British engineers who had to design apparatus with a great expenditure of time and money, to make the principle practicable, which it certainly was not previously.

With a 5-cwt. charge (every 6 hours), each retort would carbonize 1 ton of coal, which should yield from 10,500 to 11,000 cubic feet per ton, provided the top seam of Ruhr and bottom seam of Saarbrüken coal is used. Against this, we are told that the estimated capacity per retort is 8825 cubic feet, and in practice 9531 to 9884 cubic feet. Still a 5-cwt. charge for a retort 11 ft. 6 in. long is far too heavy, although German coal gives off gas more easily than British. In the English 20-feet retorts, we carbonize 7 to 8 cwt. in 6-hour charges, and do not recommend greater duty.

Take now the construction of the retort-bench. In fig. 6, it will be observed that there are no end buckstays, although these are shown on the drawing; and yet it is readily observed, from



Duplicate Elevators (Cased-in Type), to Transfer Coal to Overhead Hoppers.

the photograph and drawing 11, that these have never been put in. Even apart from the expansion, the fact of carrying the elevator on brickwork built on the top of the bench would necessitate these end buckstays and tie-rods. Anybody who has heard a neglected tie-rod snap will know how these benches are answering now.

It will also be remarked in photograph 10 that there are no braces across the mouthpiece flanges tied to the buckstays, to keep the retorts from slipping down; and although they are not so indispensable on the top mouthpieces, they also ought to be put on there.

As a matter of fact, the front double buckstays are not nearly so heavy as the occasion requires. The front buckstays are apparently not tied to the back buckstays, either by rods at the foot or joists at the top. Therefore, the hydraulic mains are carried on brick piers off the top of the bench, which must make it a difficult job to keep a correct and even seal. This is arranged in such a manner that all the weight of the bridge-pipes and ascension-pipes is thrown on to the mouthpieces.

The buckstays on the charging side are not tied in any way to the wall of the retort-house, although they have to carry the additional weight of the charging-shoot. The overhead coal hoppers are carried, on the bench side, on brick piers built off the top of the bench, and not in any way supported by the buckstays. The overhead coal tanks are not so good a design as those used in this country, and are likely to jamb the coal in the opening. There is not a discharge outlet for every vertical row of retorts, but only two outlets to three rows, which complicate the charging of the retorts, because, when charging the middle row, the charging-shoot would have to be first filled, and then drawn along to the mouthpiece. On the New Conveyor Company's patent principle, there is an outlet to every vertical row of retorts, and each outlet has a measuring box attached, which can be regulated to give a charge of from 5 to 9 cwt. Thus it is not necessary to move the charging-shoot with a load of coal in same, as, when the mouth is in the retort, the charger is immediately under the measuring chamber. On a 20-feet retort, a good even charge cannot be obtained, unless the feed of coal is regulated from the *measuring chamber*, as, unless one has that height of fall, small coal will not run down to the bottom of the retort. If the coal is held in the charger, a sufficient fall is not secured to raise the speed, and get the coal to the bottom of the retort.

The charging-machine adopted at Zurich is very imperfect, having no regulating-device to check the speed of the coal. It is arranged with a sliding shoot, which will repeatedly jamb when it is pulled out of shape by heat; and, even if built very slack in the slides, the weight of the sliding shoot itself will make the lifting difficult. The whole is carried on a monorail, instead of a double track, as in this country. There is no provision for weighing the coal either in the hoppers or the measuring chambers. If the levers for opening the slides in the overhead coal-hoppers are the result of the superior technical education taught abroad, it may be as well to at least combine any system which we may copy with a little mechanical knowledge and ordinary foresight. They are attached to bearings fixed on buckstays, having two handles which a man by slightly stooping could grasp in either hand. An upward strong pull through a distance of 4 feet would open the door 12 inches by the action through three levers. He must hold on tight till the charge is in the shoot, and then let go to close off the supply of coal. All this time he is compelled to hold on to the handles, which are constantly within 12 inches of the wall of the bench on the hottest side; and his face, for at least 30 seconds, will be in like proximity. There is an installation of inclines in Lancashire in which the handles working the doors were 9 feet from the bench; and these got so hot that it was not comfortable to work them, so the engineer complained.

The section of the Zurich retorts is also bad, being oval, which is worse than the old Ω shape, because, when the coal begins to expand into coke, it will jamb against the contracting sides of the retort, and make the extraction of the coke difficult. Again, the stages of the Schlieren house are so narrow that the heat must be terrific.

Finally, speaking not of the Schlieren works, but generally respecting Continental practice, I fail to understand why such short retorts are used—12 feet, against our 20 feet. It makes the first cost large; and the cost of working per mouthpiece is as much as on a 20-feet retort, while the results as regards make are not so good. Two German engineers with whom I have discussed the question approved of our English installations, and stated that they would never again put in short retorts, but would adopt 20-feet lengths.

I am, owing to the courtesy of Herr H. Salzenburg, of Bremen, enabled to supplement this article with photographs showing some work done by the New Conveyor Company, Limited, for the new inclined retort-benches there; and the collateral tale told by them clearly shows the difference in the designs used at Bremen and Schlieren. All the brickwork and staging was designed and made in Germany; but the overhead tanks, measuring boxes and charging-shoots, elevators, conveyors, &c., were constructed in Smethwick.

(To be concluded.)

GAS COMPANIES, THE WELSBACH COMPANY, AND THE TRADE.

By Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S.

The discussion on the present state of affairs and the future management of the Welsbach Incandescent Gas-Light Company, which has attracted so much attention during the past few weeks, possesses an interest for all concerned in the sale of gas which is second only to the direct pocket connection of an actual holder of stock in the concern. And that not only in regard to the probable effect of the energetic action now being taken, upon the future selling price of the Welsbach specialities, but also because the Board of Directors who have just been rejected by an overwhelming majority, depended upon a constrained, not to say unfriendly, attitude towards gas companies, and made it a prominent plank in their platform to the last—apparently regarding it as a point of vital importance in connection with the prosperity of the concern. But the shareholders, as is not unnatural, were not inclined to agree with anything recommended by a Board who had failed to earn a dividend for them. That strong feeling prevailed upon this subject, is repeatedly evidenced in the reply of the Directors to the report of the Advisory Committee, in the words of the Chairman, and in the separate statement issued by Mr. Julius Moeller. I refer to expressions such as :—

"Experience has shown that the attitude of most gas companies to all forms of gas economizers has been one of either active or passive hostility." . . . "The gas companies would neither push sales nor recommend mantles, except to increase the consumption of gas in competition with the electric light, and then only on their own terms."

. . . "The goodwill of the Welsbach business depends upon the goodwill and active co-operation of the trade as distinct from the gas companies." . . . "If shareholders desire to ruin their business, they will alienate the trade by associating the Company mainly with the gas companies." . . . "The gas companies were opposed to the introduction of incandescent gas lighting in 1893 and 1894; and if they take an interest in it now, it is rather out of fear of competition of electric lighting than from any desire to push the most economical system of gas-lighting." . . . "The interests of the two are not identical." . . . "It is the public, not the gas companies, that create the revenue of the Welsbach Company." . . . "It was through the trade that the business was built up when the gas companies would not look at our industry." . . . "Association with the gas companies as suggested by the Committee, would be fatal." . . . "It would alienate the entire trade upon whose goodwill the Company are dependent for 85 per cent. of their business."

Many managers of gas undertakings and others interested in gas supply, and also having extensive dealings with the Welsbach Company, will find in these extracts an explanation of much that they could not understand in connection with the treatment extended to them. For it will scarcely have occurred to anyone that a body of gentlemen, presumably possessing the experience of a practical nature in gas enterprise, to which, by inference, they lay claim, should seriously entertain convictions of this kind. The attitude of the gas industry in 1893 and 1894 may be discussed as a matter of general interest; but a more pertinent question, from a business point of view, is the attitude at present or likely to be adopted in the future. I do not infer that actual hostility towards gas companies exists among the chiefs at York Street. The prominent idea appears to be that the trade must be propitiated at all costs, and that there must be special watchfulness not only in respect to special terms, but also as to the ultimate actions of the gas companies, lest anything should be done that may have the unfortunate effect of alienating the goodwill of the trade. It does not appear to have occurred to these gentlemen that their own actions, undertaken ostensibly for the protection of their own patents and of their agents, have a deleterious effect far exceeding anything that might follow from the acts of the gas companies. The threats of a fire and slaughter order, and especially the action of proceeding against small users who are not in a position to carry a case through the Law Courts, have brought the Welsbach patents into bad odour among the large section of Britons who object to coercion in any shape or form, and acted as a strong deterrent in the case of nervous people, against having anything to do with the mantle. "Oh! yes," customers say, "the mantles are cheap and effective; but I don't want people prying round my premises, and I don't want the trouble of examining every mantle to see that it is genuine." Procedure against the user may be good law—I do not say it is not; but the man in the street says that if he buys a thing he is entitled to the free use of it, and that any questions of infringement should be fought out with the party who sold it. All this may be only sentiment; but it does not assist the trade in building up the business.

No gas engineer would wish to belittle the value of the Welsbach patents as a means of increasing the sales of gas, or to make comparisons of an invidious nature; but the statement that the public create the revenues of the Welsbach Company needs some qualification, for there is not much revenue created in localities where gas is not available, or by parties who prefer to use candles, oil, or electricity. The creators of Welsbach revenue are not the public as a whole, but only the gas-consuming section. Granting that the Welsbach Company hold controlling interests as regards one special kind of appliance for consuming gas, the gas companies may claim that they established their business without its aid, and that the increase in the sale of gas during the last eight years has been far in excess of that brought in by the gradual building up of the incandescent business. If every Welsbach burner was put out of use to-morrow, the consequences would be serious, but not fatal. There is a very respectable trade in Sugg's and Bray's burners, gas-cookers, gas-fires, and so on. So the controlling interests of the Welsbach Company scarcely extend to the fortunes of the gas industry as a whole. But in view of the decisive remarks made by the Advisory Committee, this point need not be laboured further.

The Welsbach Directors refer with some degree of pride to the gradual increase of sales during the past eight years, and certainly their figures are rather big and imposing. There is something about the word "millions" of a nature akin to the virtues ascribed to that blessed word "Mesopotamia." It may be remarked in passing that the figures do not show evidence of that steady continual increase that might be expected to follow the persistent effort of good canvassers, but that the advance is of a saltatory character, each jump ahead being co-incidental with a reduction of price. As compared with totals usual in business, the figures are large; but when we remember that they represent the monopoly of the whole of the United Kingdom, or refer to the number of gas consumers and the quantity of gas over which they are disposed, they assume a different character. Up to the year 1899, an annual sale of half-a-million had not been greatly exceeded. In 1900, a large increase was recorded; but the total did not reach a million burners. During the eight years ended 1900, the Company have disposed of something less than 5 millions; so we may assume that the total number of Welsbach burners in use to-day is between 3½ and 4 millions, inclusive of those used for public lighting. According to the Parliamentary Returns for 1900, the Statutory Gas Companies own an aggregate of 3½ million customers, who consume about 130,000 million cubic feet of gas per annum. This quantity refers to the total consumption of gas for all purposes—lighting, cooking, heating, motive power, and special technical uses. Adding private companies and parties who own private gas-works, we may say that there are in the United Kingdom some 5 million users of gas, whose aggregate consumption is not less than 200,000 million cubic feet, of which the quantity used for lighting would not be far less than 100,000 million cubic feet. The number of Welsbach burners in use does not come up to one per consumer; and as regards quantity of gas, the total consumption for lighting, divided by the number of Welsbach burners, gives a quotient of from 25,000 to 30,000 cubic feet.

These figures are only approximate. They serve, however, as some indication not only of the relative magnitude of the business which has been done, but of that which might have been done. But we must not overlook the outsiders, or, as they are sometimes called, the infringers, who have been estimated to run a very close second to the genuine Welsbach sales, in regard to quantity. After reasonable allowance on this head, however, it is evident that the 15 per cent. of the total gas consumption claimed for the incandescent burner is a very liberal estimate. Is there anything more than a mere coincidence between the 15 per cent. of business accredited to gas companies and the 15 per cent. of the total consumption? Possibly the latter figure has been mixed up with the former, and the real estimate was a much lower proportion. However that may be, the total is not a satisfactory showing, and is very far below the saturation point. Something has been said about the adoption of incandescent burners in Germany to the extent of over 90 per cent. of the total gas consumption. Conditions vary in different countries; and no English town is likely to obtain such a percentage. The higher the price of gas, the greater the economy secured by substituting the incandescent for the flat-flame burner; and the financial aspect of the question is not so important when gas is obtainable at 2s. per 1000 cubic feet as where the price is three times that amount. The average price in England is less than in any other country; and for that reason alone, there will always remain a larger proportion of flat-flames in use. But the advantages of the Welsbach system are not confined to economy, and are of a sufficiently substantial character to be capable of securing for it by far the larger share of the gas lighting consumption—not less than 75 to 80 per cent. of the whole, and an average of something less than 5000 cubic feet per burner, instead of 25,000 cubic feet. Viewed in the light of these considerations, it is evident that the large totals quoted by the Welsbach Directors represented but a mere fraction of the business that might have been done—and, perhaps I should add, it ought to have been done.

Not the least remarkable feature about the quotations above given is their contradictory character. While roundly asserting that gas companies are opposed to everything that promises economy of gas, the same bodies are credited, or discredited from the Welsbach point of view, with an intense desire to give away appliances at cost price—a complaint from which, by the way, the Welsbach Directors have always been remarkably free. And while actively or passively hostile—who has ever heard of passive hostility?—towards the Auer burner and mantle, they are at the same time pressing to have it cheaper. How it is possible to be actively hostile towards an appliance and at the same time to be anxious to sell it cheaply, is incomprehensible. While suggesting that the reason why the gas companies have not supported the appliance, or the policy of the Welsbach Company, which is another story, is because their business is down another street, they infer that the trade are docile and willing to accept any restrictions, but that the gas companies are not so manageable, and want to have something to say about terms of business. The trade have no interest in the appliance beyond the discount on the sale; while gas companies have a permanent interest in it as a means of using gas. The essence of business is to unite interests and not to separate them. Every important enterprise consists of a combination of interests, some apparently conflicting; and the successful business man is the one who can reconcile and satisfy, rather than emphasize and accentuate, conflicting interests. It has yet to be proved, however, that the real interests of gas companies and of the Welsbach Company are so diverse as not to admit of being united under an arrangement of a character similar to that practised in ordinary business transactions. But perhaps the best answer to all this would be a plain statement as to the relative proportions of the large increase of business obtained during the latter half of 1900, as a consequence of the reduction in price, was due to the trade, and how much to public lighting and the adoption of a maintenance system by gas companies.

These are very important branches of business, and have been developed exclusively by gas companies. Then, while one sentence infers that the gas interests have done nothing, but rather hindered the efforts of those who are pushing the appliance, another states that what they have done was not from an honest desire to benefit their customers, but was merely forced from them by competition. This point is laboured heavily, though the object of it is not at all obvious. All persons who sell mantles, whatever their *status*, are presumably actuated by ordinary business instincts; and to infer that the trade move on a higher platform, and are actuated by more worthy motives, is an extraordinary delusion. The usual custom of manufacturers is to lay themselves out to make sales; and so long as this result is obtained,

they do not concern themselves about the motives which actuated purchasers, or the ultimate destination of the goods. But the Welsbach Directors have always been troubled with a grandmotherly solicitude as to the ultimate destination and disposal of the goods supplied to gas companies. To an ordinary individual, it would appear that whether a cargo of 100,000 mantles was sold to a trader or to a gas company, the result to the Welsbach coffers was the same. That the cheque of a statutory company for £1000 was in every respect of equal value to that of an ironmonger for a similar sum, and that the value of an order was not enhanced by bearing the signature of a tradesman, or depreciated by coming from a gas company, and that it is quite as good, even if dragged out with sighs and groans by the stress of competition, as if given cheerfully and willingly. Excessive alarm, or fear of any kind about competition, has not been so prevalent among gas companies as the Welsbach Directors appear to imagine; and in this, as in other matters, their experience has been of a very peculiar kind. But accepting their conclusions, it is no reproach to be compelled to plead guilty to the adoption of a more aggressive policy under the stress of competition. It may at times be a hard master, driving people against their inclinations; but the absence of competition may mean poor service, high percentages of profit, small aggregate sales, and a dwarfed, stunted condition of business generally. The experience of the Welsbach Company, as compared with that of manufacturers of other important specialities that are not protected by the patent law, is not encouraging, and serves to show that the absence of competition is not an unqualified blessing.

(To be concluded.)

OBITUARY.

The death occurred on the 2nd inst., at the age of 76, of Mr. W. Frankland, Chief Clerk in the Gas Department of the Bradford Corporation. Deceased had been for 48 years in the service of the Corporation and their predecessors, the Gas Company, and throughout this long period gained the respect and affection of the entire staff over whom he had control.

The original members of the Southern District Association of Gas Engineers and Managers will, we are sure, unite with us in expressing deep regret at the death, on the 27th ult., at Radford, Coventry, of Mr. Charles Farrand, who was for some time the Auditor of the Association. Deceased was formerly Manager of the old Croydon Gas-Works, and continued in that capacity for many years after the opening of the works at Waddon—in fact, until Dec. 31, 1877, when he retired on a superannuation allowance. He was then very ill, and it was feared that his life would not be much prolonged. He was followed in the managership by Mr. Wilson, who, after holding the position for about seven years, was succeeded by the present Engineer and General Manager, Mr. J. W. Helps. Mr. Farrand was 77 years of age. He was twice married—his second wife dying only a short time ago. He had a family of one son and four daughters, one of the latter being the wife of Mr. C. E. Botley, of Hastings. His son, Mr. Frank Farrand, was his assistant when the new gas-works at Waddon were opened in 1866. He was afterwards, for some years, Manager of the Caterham and Kenley Gas-Works, and is now Manager of the Ryde Gas-Works, having succeeded the late Mr. George Garnett.

PERSONAL.

Mr. Robert Forrest, the Manager and Secretary of the Birnam Gas Company, has been appointed Manager of the Banchory Gas Company.

Mr. Robert Croll, who for the past seven years has been in the service of the Broughty Ferry Gas Commissioners, has been appointed Manager of the Castle Douglas Gas-Works, in succession to Mr. Peter R. Chalmers, who has gone to Kelso.

Mr. C. H. Webb, M.Sc., draughtsman in the Gas Department of the Stockport Corporation, has been appointed Assistant-Engineer. Mr. Webb is a son of the Chairman of the Gas Committee, whose recommendation gave rise to considerable discussion in the Town Council; and it was only confirmed by the votes of the Aldermen. The appointment was not advertised.

When noticing the appointment last week of Mr. John Terrace to the Assistant-Engineership of the Tottenham and Edmonton Gas Company, we omitted to mention that, while he was in Sydney in connection with the business of Messrs. Humphreys and Glasgow, he took entire charge of the works of the Australian Gas Company, during the illness of the Engineer, extending over a period of some months. This was an important trust for one so young; and he justified the confidence.

Mr. C. F. Franks, Assistant to Mr. Charles Carpenter at the Bankside station of the South Metropolitan Gas Company, was recently the recipient of a presentation from the officers and workmen, on the occasion of his marriage. The gifts consisted of a revolving entrée dish, teapot, and "Cromwell" clock, appropriately inscribed. In making the presentation, Mr. Carpenter referred to Mr. Franks' career with the Company, and the pleasure it gave him to testify to his possession of two essential qualifications for a position of authority over others—painstaking application to master the details of his business, and a sympathetic heart to regulate his dealings with his fellow-employees. The proceedings were of a very cordial character.

TECHNICAL RECORD.

THE TABLE PHOTOMETER AND THE STANDARD PENTANE LAMP.

A Few Criticisms.

The London Section of the Society of Chemical Industry, at Burlington House on Monday of last week, had before them an example of the new table photometer and ten-candle pentane lamp, as prescribed by the Gas Referees for use in the London gas-testing stations. Dr. Frank Clowes described in detail the lamp and its accessories, and the method of using them; and his audience were extremely interested—this being, we believe, the first time the members have had this system of gas testing brought before them independently of other matters.

Dr. Clowes stated that there were now 23 examiners engaged every day not only in testing the gas supplied in London for its illuminating power, but in making several important purity tests. Some twenty of these gentlemen were colleagues of his own; and they were constantly occupied in making examinations in Greater London. The Acts under which this testing was carried out prescribed that the methods of testing should be arranged by a body of carefully selected men, known as the Gas Referees. It might interest the members to know that the Referees were at present Professors Harcourt, Boys, and Haldane. They had a number of duties to perform, and one of them was the selection of the sites of the testing-stations. In the exercise of their prescriptive rights and duties, the new table photometer had also been brought into use. The new standard of light was Professor Harcourt's own; and the photometer itself mainly owed its arrangement to him, though Professor Boys had had a great deal to say regarding certain ingenious mechanical details of the apparatus.

Speaking first of the pentane lamp, Dr. Clowes said, as the name implied, the vapour of pentane was burnt in it. He supposed most of the members would be aware—any way all those who had dealt with light petroleums would be aware—that the vapours of these petroleums were of great density. The density of the pentane vapour was almost precisely two-and-a-half times the density of the air, and so it was an extremely heavy vapour. Before commencing, Dr. Clowes had poured some pentane into a beaker; and turning to it, he remarked that the liquid vaporized very considerably at ordinary temperatures of the air. During the time the pentane had been in the beaker, the vapour had been raising and lifting the air in the vessel. By simply tilting the latter, without pouring any of the liquid out, they could get the vapour transferred by its high specific gravity to a second vessel, and be able to kindle it. [Dr. Clowes here performed the experiment.] It was therefore quite easy to pour the vapour out and to syphon it from a higher level to a lower, very much as one syphoned liquid. It was on this principle that the Harcourt pentane lamp depended. The lamp was fixed to a pedestal; and the burner was supplied by a constant stream of mixed pentane vapour and air, through the longer leg of a syphon passing from a little flat metal chamber (called the carburettor) at the top of the stand. In the side of the carburettor was a small window for the purpose of seeing the level of the pentane. On the top of the chamber were two tubes, each controlled by a stopcock. One served for the inlet of the air which travelled over the surface of the pentane, and then passed through the second tube to the syphon. It was only necessary to open both the stopcocks to fill the syphon-tube with the heavy vapour. The longer leg of the syphon was connected to the burner by a length of rubber tubing. In starting the lamp, the examiners did (what they termed) a little "milking," in order to draw the vapour from the box down the tube; and then, by its weight, it continued to fall to the burner. The air in its passage over the pentane got charged with it; and by adjusting the taps properly, such a mixture of pentane was obtained that a standard flame was secured for testing purposes. He described, by means of a diagram, the arrangements for maintaining the flame at its standard point. An important addition, which was a great convenience, had been made. It was found that the easiest way to keep the flame at the standard point was to adjust the air supply at the entrance to the carburettor. This they were now able to control, from the position at which the observer sat, by means of a small screw which moved a thread running from the operator's end of the table to the lamp. The thread controlled the position of a little cone, which regulated the supply of air to the carburettor.

This standard pentane burner, Dr. Clowes remarked, had taken the place of the old candles. The candles were never, of course, quite satisfactory, because they could never be made to absolute standard quality; and it was only by burning a number at one time that something like an average effect could be obtained. The candles gave a fairly satisfactory result by doing this; but they were not such a steady or so satisfactory a standard by any means as this new lamp of Professor Harcourt.

Then coming to the photometer, it was as its name implied a table photometer. The whole apparatus was arranged on a flat table, instead of being made to slide on a bar as in the old photometer. Speaking generally, the two sources of light (the pentane standard and the standard argand burner with which the gas to

be tested was used) both lighted one side of the observing-screen—the light of each was made to strike separately on contiguous portions of a little transparent screen. The greatest novelty in this apparatus was that they did not bring the two illuminations to equality by shifting the position of the burner from which the gas was being tested; but the illumination was brought to equality by adjusting the supply of gas to the argand burner—the gas being controlled by a tap which was at the right hand of the observer. If on looking at the two illuminations on the screen, he found they were not equal, he simply moved the tap, and set it in such a position that the illumination from the flame of the gas supply was exactly equal to the illumination from the standard burner; so that really the photometer depended upon the principle of gradually adjusting the feed of gas to the standard burner in such a way that the illumination produced by the burner was brought to equality with the pentane lamp.

The auxiliary apparatus and screens, their disposition on the table, and the methods of ensuring standard conditions, were all carefully described and explained by Dr. Clowes. The whole of the apparatus, he mentioned, was painted black, so as to save any reflected light. A curtain was also placed at the end of the table, in order to prevent any stray reflected light from the walls and draughts to the burners. He had been told by the examiners that the apparatus worked very satisfactorily indeed, even when the ordinary light of the room was scarcely reduced; it was quite possible, unless there was some brilliant source of light present, to take readings with very fair accuracy. Of course, it was better to reduce the illumination of the room; but it was not absolutely necessary.

As chemists, those present would ask what was the nature of the pentane which was used? Of course, the success of the lamp as a standard depended largely on the pentane which was burned being always of fairly uniform nature and composition. It was the fraction (after three distillations) of light petroleum which distilled at 45° C. This portion was kept apart, and subjected to various processes of purification. Methods were described by the Referees by which the pentane might be tested, so as to know that it was of the requisite degree of purity suitable for use in the standard. One of the determinations was that of vapour density, which lay between 36 and 38.

In order that the apparatus might be kept in standard working condition, it was also necessary that the holes round the steatite ring of the argand burner should be of perfectly accurate gauge. Each perforation in the ring of the argand must be precisely 0·45 inch; and each gas examiner was now supplied with two wire gauges for testing the holes successively all round the ring. One of these gauges was too small, and the other a little too large; so that one must pass in easily, and the other must refuse to pass in, in order to ensure that the holes were perfectly true to size. Not only must newly-made burners be gauged by these wires, but periodically the smaller gauge must be pushed down the holes of the burners, to ascertain that there was no choking taking place.

To keep the pentane flame always to its proper size, a little mirror was provided, in which the observer could see the reflection of the top of the pentane flame, and so ascertain whether the flame was adjusted rightly between the two specified points. If it was not, by still watching the mirror, he could, by means of the screw previously referred to, alter the air supply to the lamp; and in this way it was very easy for the observer to keep the flame adjusted to its necessary dimensions. Another little mirror reflected light from the argand flame down on to the gas tap, so that the observer could see to read the scale. It also enabled him to see the face of the meter, and read the rate at which gas was passing. Of course, the rate of the passage of the gas was read after equality of illumination was obtained on the disc.

As a matter of interest, Dr. Clowes stated that a short time ago, he was at the house of Mr. Vernon Harcourt; and he showed him (Dr. Clowes) an application of the principle of this pentane lamp to the lighting of his billiard room. There was no coal gas laid on to the house, which was out in the country. At the top of a tower he had placed one of the carburetting boxes; and the vapour of the pentane, by its weight, was brought down to the billiard room precisely as it was used in the standard lamp. A most satisfactory illumination was obtained. Of course, pure pentane was not employed in the lamp; and after it had been in use some time, there was a residue of somewhat higher specific gravity than true pentane—the specific gravity of the pentane rose as it was used. Therefore, it was necessary, in the course of a little time, to empty out the residue contained in the carburettor before the pentane was exhausted. But Professor Harcourt, at his house, got over this difficulty by having a little lamp placed under the carburettor; and when he found the light was getting low in the billiard room, he lit the lamp, and used it until the whole of the residue was exhausted.

The example of the photometer present was, Dr. Clowes mentioned, the one which the London County Council called the travelling or portable photometer. The photometer was quickly converted into portable conditions, and easily taken to pieces and carried away. In other respects, it was identical with those used in the testing-stations.

Discussion.

The Chairman (Mr. Otto Hehner) congratulated the present gas examiners on having this new instrument for carrying on their work. He himself had laboured for many years with those inexact instruments of measurement—candles, and had recognized for years how inadequate that standard was. Great pains had long since been taken to establish standards of weight and length, measures of heat, and standards for electricity; and when one remembered that it was only quite recently that the candle was the actual measure of illuminating power, one could hardly express his gladness that it had now been superseded by the instrument before them. It was not generally recognized what an important thing photometry was. But when it was considered how large was the amount of money spent in illumination, and that everybody required light, well, then, it would be conceded that its quality ought to be exactly measured. That they had not before had an accurate measure was astonishing; and it showed how little attention had been given to the work. Mr. Dibdin had contributed a number of valuable papers on this subject; and he took it that Mr. Dibdin had done a great deal to bring about the happy condition at which they had now arrived.

Dr. C. A. Kohn (Liverpool) said he had a question to ask with respect to what one might call the reversing of the ordinary conditions of gas testing adopted in this standard. One recognized in the 10-candle standard many advantages—not so much in the purity as in the height or strength of the standard itself. To be able to work up from 10 to 16 or 20 was an enormous advantage compared with working up from 2 to 20. The candle power, he took it, was measured by the consumption of the gas; and he should like to ask Dr. Clowes whether he had confidence that, with gas measured under ordinary photometrical conditions and burnt at the rate of 5 cubic feet per hour, the comparison remained very much the same, and to what extent, if there was a variation, the variation would depend on the richness of the gas. Perhaps there were other points bearing upon the comparison; but it was especially in reference to the relative value of this measurement and the direct value from the 5 cubic feet per hour measurement that he wanted information from Dr. Clowes.

Mr. D. A. Louis (London) said, since he had been sitting there, he had been watching the flame of the pentane lamp. He did not know whether or not it was then arranged for testing purposes, because there was a variable amount of darkness visible in the flame. It kept zigzagging about, and there was irregular illumination below the line. Another thing that struck him about the composition of the material used was this: Dr. Clowes had informed them that one of the difficulties Professor Harcourt had found in his local arrangement at home was that, after a certain time, it ceased to give the necessary illumination; and he then applied a little artificial heat. Now, supposing there was a variation in the temperature of the atmosphere, he should like to know whether this would affect the pentane in the box—whether, in warm weather, they would get a better illumination from the flame than in cold weather. It also struck him that, when the box was nearly full, there would be a small atmosphere of air above it, and that atmosphere of air could only take up a certain quantity of the heavy vapour, depending upon the temperature; and therefore probably there would be a variation when they took in a larger quantity of air than when a smaller quantity was passed in. The feeding of the lamp was rather interesting; and he asked whether it was necessary that the air feeding the lamp should be at a certain fixed temperature. He could understand that the inner air would be well warmed by the circulation round the chimney; but if the outer cone of air had also to be of a certain temperature, he should say that it would be subject to variation. On a day like that, for example, it would be very cold indeed compared with the air supplying the inner part of the flame.

Mr. T. S. Lacey (London) said he had had a great deal of experience with this pentane photometer during the last few years, though not much during the last few months; and he must say that the instrument was, so far as it seemed possible with an instrument based on a flame standard, as nearly perfect as it could be made. It was important to note that the photometer was only part of the apparatus that was necessary for taking the light value. The room in which the photometer was used was a part of the instrument; and this photometer, like all photometers, would vary in its results according to the place in which it was employed. It was quite useless to specify the photometer which was to be used unless the conditions and nature of the room—ventilation and so on—were specified at the same time. The argand burner was one which, even at the 16-candle point, was very sensitive to slight differences in the air supply. If it was burning to about 17 candles, it was not so sensitive; but if it was burning at a lower rate—say, 15 candles—it would be more sensitive. The difference in the temperature of the air must affect the amount of air passing through the heated chimney; and it also affected the amount of air which passed up the longer chimney belonging to the 10-candle standard. It by no means followed that the difference in the temperature and in the air supply to both burners would affect the light from both in the same proportion. Curiously enough, there was no regulation for temperature at which this instrument might be used. To use it as a standard instrument, he thought some temperature limit should be fixed. No one had succeeded in proposing a suitable standard except a flame one; and such standards did vary with the different conditions of the atmosphere in which they were burned. If the flames were affected in different directions, no doubt they would soon find the variations taking place; but the flames were affected in the same direction, though not in the same degree. Therefore, though they did not notice the variations in the flames, they did exist. Speaking of the general arrangement of the instrument, he said it was a great satisfaction that the whole instrument could be standardized very quickly.

They had standard gauges for the lengths, which enabled the different parts to be properly placed very quickly. Examining the different parts, it was seen what an immense amount of care and scientific thought had been given to their construction. There had been an alteration in one part of the photometer; and he thought he had something to do with it. It would be noticed that the two lateral screens had a space underneath them; but originally they were constructed so as to reach to the bottom of the table. He pointed out to the Referees, and proved to demonstration, that, when the screens did not come down to the bottom, the flames were much steadier. If the flames moved about, and their peaks were not (as they ought always to be) at equal heights, it simply showed there were draughts. There was no difficulty in getting plenty of air through a room. But the air should be admitted in a number of openings in the floor; and the currents of air should be vertical, and not over the top of either of the burners. If there were currents of air passing over them, then the flames moved about.

Dr. Paul Dvorkovitz (London) said he had had to suffer through the absence of a perfect photometer. About six years ago, he had a contract with the Bradford Corporation to enrich their gas by a certain number of candles; and many thousands of tests had to be carried out on the coal gas unenriched, and the coal gas enriched. If they had had at their disposal such a photometer as they had now, he was quite sure that it would have been shown that his contract with the Corporation was being fulfilled. The objection to the whole of the photometers which had been in use was that there had been a necessity to pass the gas through at the constant rate of 5 cubic feet per hour. But if they passed 5 cubic feet of rich gas and then 5 cubic feet of poor gas through the same burner, they got absolutely different results. A burner had only a certain supply of air, and naturally with the same burner they could not, passing 5 cubic feet of poor gas and then 5 cubic feet of rich gas through it, show in proper proportion the increased advantage of the latter gas over the former. The results could not be true.

Dr. Clowes, replying to the discussion, said Dr. Kohn had asked about the testing of gas of varying candle power. He was quite right. It was not correct to test gas of considerably less than 16-candle power by precisely this arrangement. If, for example, they wanted to test a gas which was of 14-candle power, the argand burner ought to be shifted away, and made into a 14-candle standard. This Mr. Harcourt had abundantly proved. Mr. Louis unfortunately had been observing the wrong part of the flame. From where he had been sitting, he could only see the jagged top of the flame; but if he went round to the other side of the photometer, he would see the portion of the flame which was actually used for testing. Objection was taken to the accuracy of the apparatus when the temperature of the room or the atmosphere of the room changed. It would appear that there must be a more rapid evaporation of the pentane when the room was warm than when comparatively cold. Most careful experiments, however, had been carried out to ascertain whether this amounted to anything; and Mr. Harcourt had made standard tests varying through such ranges of temperature as would be possible in any observing-room. He had found that, with the standard conditions he (Dr. Clowes) had mentioned, the flame still maintained its standard character. The temperature did not affect it to any appreciable extent, even when the range was wide. As to other conditions mentioned by speakers, of course, they must not have these flames actually blown about. But when the screen was in position, there was not the necessity with this instrument for the niceties which were so frequently insisted upon as absolutely indispensable for accuracy. The instrument had been tried under extremely severe and varying conditions from time to time, and had given absolutely identical readings. The niceties which applied to the older forms of photometers did not apply in the same degree in this type. Mr. Lacey seemed to think that this photometer had need of a most carefully designed and carefully appointed gas-testing station—that its use under any conditions but these would likely lead to absolutely untrustworthy results. There he was entirely mistaken. He (Dr. Clowes) had most carefully tried this under conditions that were not considered standard ones; and he could assure those present that the readings of the photometer would not vary. Of course, he did not refer to actual dancing or movement of the flames. But the old refinements were not essential to this instrument.

INCANDESCENT BURNERS FOR SIMPLE WATER GAS.

The successful application of simple, or uncarburetted, water gas to lighting by means of Welsbach mantles appears to depend very much on the type of burner used. Since water gas normally burns with a non-luminous flame, and requires only about one-third as much air as does coal gas for its complete combustion, it is evident that ordinary incandescent gas-burners, with internal air supply, as used for coal gas, are unsuitable for water gas. Yet, by reason of the very high temperature of its flame, water gas *à priori* should serve far better than many gases of higher calorific power for raising a mantle of the rare earths to a high degree of incandescence. Unfortunately, however, the water-gas flame is relatively small in size, and can only be made to heat uniformly a small mantle, except by the aid of some specially constructed burner.

So far, the application of simple water gas to lighting is on such a limited scale that few inventors have attempted seriously to design good water-gas burners for Welsbach mantles. One of the few, however, who has tackled the problem with eminent success is Dr. Strache, of Vienna, who may be regarded as the leading latter-day authority on the manufacture and application of simple water gas for lighting purposes. He obtains from this gas, which has only half the calorific power of coal gas, fully as high an illuminating duty, as is afforded by coal gas with the ordinary "C" Welsbach burner and mantle. This result should give pause to those who would set up a standard calorific power for public supplies of gas in place of the now discredited standard illuminating power. The light obtainable by the incandescent system is as independent of the calorific power of the gas consumed as it is of the illuminating power so-called. The water gas used with Dr. Strache's burners, in connection with various installations in Austria, though in some cases made from coal, has only about half the calorific power of coal gas, and, of course, is devoid of illuminating power if burnt in open-flame burners.

The following is a description of the Strache water-gas incandescent burners: Welsbach or similar mantles are applied to a burner which in many respects resembles an argand. The mantle is so attached to the burner that the flame traverses it completely from the interior to the exterior. It is important under these conditions, on the one hand to bring in air to the flame from all sides, and, on the other hand, to ensure that the

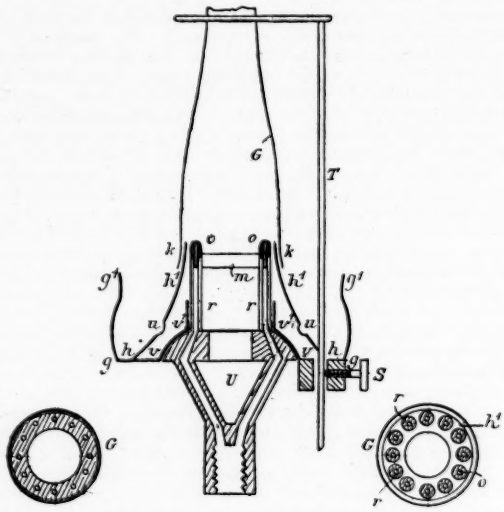
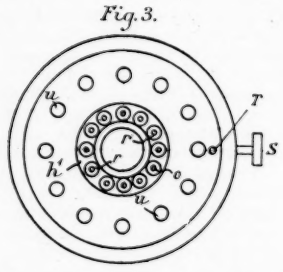


Fig. 1. Fig. 3. Fig. 2.



mantle is close to the orifices by which the gas issues from the burner. By observing these conditions, it becomes possible to obtain an illuminating effect which bears a favourable relation to the amount of gas consumed.

The first practicable argand burner tried was one known as the "American," and was constructed primarily to ensure as perfect a supply of air as possible to the flame. The holes by which the gas issued were, however, too far removed from the mantle. In more recent types, great importance has been laid on the distance between the burner holes and the mantle being very small. In order to attain this object with a mantle of given size, it was found necessary to increase the diameter of the argand burner. But, naturally, the inflow of air to the holes is diminished even to *nil* when the mantle is brought close to the holes; while experiments have shown that inflow of air between the burner holes and the mantle greatly increases the illuminating duty obtainable from the gas. It was this observation which led to the invention of the particular form of burner of which a description follows. In this form, the mantle and the orifices of the burner can be brought close together without affecting the inflow of air to each small separate flame. But to fulfil these conditions, the shape of the argand burner has to be given up.

The burner consists of a number of single-hole jets, formed of small tubes arranged in a circle, or other figure adapted to the shape of the mantle. The number of the jets varies according to the circumference of the mantle for which the burner is intended. The tubes are so fitted that each little flame receives a full supply

of air from all sides. They necessarily must be separated from one another, but may be fixed to a common base, or held together in some other suitable manner. The advantage which such an arrangement of jets presents over the argand type of burner will be seen at a glance on comparing the argand (fig. 1) with the new water-gas burner (fig. 2). In these figures, the thick outer circle (G) is a transverse section of the mantle at the level of the burner tips. From fig. 1, it will be seen that, when the mouth of the burner is brought very close to the mantle G, air can only reach each of the little flames at the outlet of the central opening of the burner, and from the outside through the meshes of the mantle. From fig. 2, on the other hand, it will be seen that in the new burner each little flame is supplied with air separately, and, moreover, from all directions. The result is a higher illuminating duty is obtained from the gas.

Fig. 3 shows one pattern of this burner. U is the bottom part, which is constructed on the principle of the argand. To this part are fitted the little tubes (*r*) having at their tips the jets (*o*), by which the gas issues. These jets are of steatite, fire-clay, &c., in order to prevent their being burnt away, and heat being conducted down to the lower part of the burner. A ring (*m*) preserves the spacing of the little tubes, and their distance from the mantle. The socket (*h*) is fixed indetachably to the gallery (*g*), and serves as a bearer to the mantle (G), which passes over it at the part (*k*). The screw (S) is used to fasten the prop T, which supports the mantle. The gallery rests on the burner at (*v v*^{1}) and can be lifted, with the socket (*h*) and the mantle, for the purpose of renewing the mantle. Openings (*u*) bring in air on to the outer surface of the mantle.

The inventor of the burner claims that its distinctive features are the number of small tubes (*r*), each forming a distinct jet, and arranged according to the shape of the mantle. The tubes admit of air being carried on to the little jets of flame, and are connected to a common base through which the gas is conveyed to them. The burner is used by the International Water-Gas Company of Vienna, in connection with the water-gas installations erected on the Strache system by them.

MR. PERCY GRIFFITH ON WATER SUPPLY.

Inaugural Address at the Society of Engineers.

There was a large attendance of members and friends at the United Service Institution on Monday of last week, to hear Mr. Percy Griffith's Presidential Address to the Society of Engineers. The branches of engineering dealt with by Mr. Griffith in his address were those with which he was, from his personal experience, most qualified to deal—the supply of water and gas. After referring briefly to the affairs of the Society, he said he proposed to consider only those modern developments of gas and water engineering which represented the lines upon which advancement was proceeding and might be expected to proceed in the near future. The remarks made by Mr. Griffith on the subject of gas were given in last week's "JOURNAL" (p. 275); and below we reproduce the portion of his address which referred to water supply.

Before attempting to deal with mechanical details connected with the question of water supply, it is necessary that something should be said with regard to the broader aspects of this most important subject; for although this must be classed among the most ancient of the engineering arts, the rapid change of the conditions in recent years, especially as regards growth and concentration of population, renders the work of the water engineer anything but a sinecure. It must strike even the most casual observer as a matter calling for very serious consideration, that even at the present time there are many parts of this country without any public supply of water at all, and others where a deficiency of water is almost an annual occurrence. Considering the vast sums of money, the amount of scientific study, and the mass of literature devoted to this one subject, this fact is certainly a marvellous, and withal a most regrettable, one; and as at first sight it appears to reflect anything but credit upon our profession, I feel perfectly justified in attempting to point out what, in my opinion, are some of the principal causes for the present state of affairs.

System of Control.—It is becoming every day increasingly apparent that the existing system of control is largely responsible for many of the difficulties which face the water engineer of the present time. By this, it is left to each district, be it a large city or a small village or merely a scattered rural community, to look after itself, whether by means of the local authority or by the help of private enterprise; and although in recent years local authorities have begun to realize more fully their responsibilities in regard to such matters, it cannot be said that, even in the majority of cases, they deal adequately with the question of water supply. The initial difficulty appears to me to arise from the uncertainty and vacillation shown by Parliament in fixing the actual responsibility for obtaining a water supply in each and every case. The Public Health (Water) Act of 1878, the most drastic measure dealing with this point, merely charges the local authority with "seeing that every occupied dwelling-house in their district has, within a reasonable distance, an available supply of wholesome water for domestic purposes;" . . . but no compulsory powers are given to render this obligation a practical one unless such a supply can be obtained "at a reasonable cost," which is defined as a maximum of £13 per house. But the most striking omission from this and other similar Acts is the point as to by whom the water supply is to be undertaken. This is left, in the first place, to private enterprise, failing which there is no doubt a technical liability resting upon the local authority to get a supply; but it is a well-known fact that, in practice, it involves a most complicated procedure to enforce the provision of a water supply on any person or body, however great the need may be. The indefinite character of existing legislation upon the relationship of private water companies to local authorities, and *vice versâ*, is also a constant source of delay to the carrying out of sorely-needed improvements, provoking much needless opposition, and affording opportunities for personal jealousy and questions of political economy arising to postpone, and sometimes prevent, the remedy of existing evils.

Areas of Supply.—Another important element in the question under review is that of areas of control. At present, there is no universal system for regulating the limits of various water districts. Companies are, for instance, at liberty, subject only to the consent of the road authorities to lay their mains, to undertake the supply of any area they consider likely to pay, without regard to any other question whatever; while local authorities are confined, except by an elaborate process of amalgamation, within the boundaries of their particular area as defined for municipal or general sanitary purposes. To go one step further, and include those who can afford to obtain parliamentary sanction for their own individual undertakings, we find some companies going direct to Parliament, others applying for a Provisional Order of the Board of Trade, and local authorities acting sometimes under the Public Health Act, 1875, sometimes under Provisional Order of the Local Government Board, and also sometimes under Special Acts of Parliament. Is it strange that, under such a system, inconsistencies and unnecessary expense and delay are the rule rather than the exception?

Physical Features of this Country.—Let me, however, present a still broader aspect of this question as regards our own country. Owing to the physical features of this island, the western portion, with its mountainous regions, impermeable surface strata, and larger rainfall, is provided by nature with an ample supply of water; whereas the eastern portion, being comparatively flat, and having a more or less permeable surface formation and a much smaller rainfall, has to sink wells, make deep borings, and provide expensive pumping plant in order to obtain the necessary supply. In some districts—*e.g.*, Essex—even these means are incapable of providing water in sufficient quantities.

Allocation of Sources of Supply.—Another feature of the case is the not uncommon event of certain sources of supply being the object of keen competition between rival applicants, involving the various authorities in excessive expenditure to secure the allotment of their proper and legal share of the water; while, on the other hand, vast quantities of splendid water are often allowed to run to waste, both from the source and through defective mains and fittings, for want of proper conservation. It appears to me indisputable that the question of water supply, more particularly the allocation of the various sources, is a matter that should not be left in the hands of individual applicants, subject only to the expensive, and often inconsistent, supervision of the Legislature, but should be treated as a public matter, and adjudicated upon by specially created Boards of Control, constituted with a view to the special requirements of the case. It is impossible within the limits of this address to carry this point further; and it is perhaps unnecessary, in view of the fact that the Government—this was in the King's Speech of last year—have intimated their intention of promoting new legislation (the nature of which has, however, not been revealed), and both the County Councils Association and the British Association of Water-Works Engineers have taken the matter up in a very practical manner.

Let it, therefore, suffice if I have emphasized the necessity for some public action being taken with a view to the amendment of the present condition of affairs; and let me conclude this brief survey by expressing a most earnest wish that the day may not be far distant when every inhabitant of this ancient kingdom may be provided with an ample supply of pure water.

Municipalization.—To those interested in parliamentary proceedings, the most prominent characteristic of recent practice has been the oft-recurring question of municipalization. This, although not strictly an engineering matter, has engaged the attention of so many eminent engineers, that I can hardly pass it by unnoticed. The ethics of the subject I can happily leave to politicians and public reformers; but having had some experience, I can safely refer to the practical bearing of the question upon the engineering features of water supply. In the first place, it is within the experience of every water-works engineer that, when advising a water company, one of the first points to be considered before any scheme can be carried out is, "What is the attitude of the local authority?" If this happens to be hostile, the procedure, and incidentally often the scheme itself, has to be adjusted with a view to eliminating the element of opposition as far as may be—as, for instance, by keeping down the amount of capital applied for, or by arranging the site of the works, the area of supply, and other engineering features of the scheme to suit the idiosyncrasies of those whose only basis for interference is often "opposition," and nothing else. The capital absorbed in arguing the details of a purchase clause, or in meeting the innumerable other points of objection so frequently raised by local authorities

(in many cases themselves in default as regards the provision of a water supply), is only indirectly of interest to the engineer in that it seriously increases the cost of the works, and consequently the charges upon consumers. The point is, however, a serious one, and calls for an immediate remedy. This can only be supplied by Parliament deciding once for all whether water supply undertakings are to be considered as municipal or private works, or at least the circumstances under which the preference is to be given to the one or the other. In regard to new schemes, for instance, some limit might be fixed to the opposition of a local authority which is not prepared to carry out the works on its own account; and, *vice versâ*, some steps might be taken to prevent private companies proceeding at all so long as the local authority concerned are willing to do so. I am confident that, however much professional business may be secured owing to the present unsatisfactory state of affairs, engineers as a body would cordially welcome a change that would clear away the uncertainties, inconsistencies, and expense that are now so common to water-works practice arising from this cause.

Large Gravitation Supplies.—Perhaps the most striking feature of modern practice is the magnitude of individual works for the supply of our large cities, and the disposition to avoid local sources of supply, and seek those which are unlimited in quantity and entirely free from risk of contamination, almost without regard to the distance between source and consumers. The cause of this is no doubt the enormous increase in the population per unit of area in our large cities; and one must admit that the want of a satisfactory solution of the sewage problem has also a considerable influence upon the question. Until we are able to render the sewage effluents from our large towns perfectly innocuous, it must be a more or less dangerous proceeding to draw a water supply from an adjacent source open to contamination thereby. On the other hand, the practice of obtaining water from outside areas, especially when these are a considerable distance away, presents difficulties which no engineer can afford to neglect or despise. Chief among these is the question of allocation. This, of course, can be, and indeed has been, satisfactorily overcome by provision being made for the supply of all towns and districts within reasonable distance from either the works or the pipe-line. Another difficulty which has perhaps not received sufficient attention, is the risk of accident to, or interference with, the line of pipes by an invading enemy, or by political or social agitators, or even by the mischief-loving lunatic. The period of anxiety through which one of our largest cities has recently passed, owing to the limited capacity of the pipe-line, suggests another element which ought not to be overlooked, and that is not only the heavy total outlay involved by any long distance gravitation scheme, but the large proportion of the total represented by each section of the main conduit. Thus arises the temptation to delay the construction of each additional section to the latest possible moment, and the risk that meanwhile the demands may exceed the supply and a water famine ensue, notwithstanding the existence of an unlimited supply in the storage reservoirs. I think, therefore, in view of these difficulties, that in every case local sources of supply should be developed to their utmost capacity before gigantic gravitation schemes are resorted to.

Underground Water Supplies.—The difficulties attaching to gravitation schemes are, however, unimportant compared to those which prevail in districts depending upon underground sources for their water supply. Here, although one is, under the existing law, practically safe from interference from rival claimants, engineering difficulties assail one in every direction. It is, however, far beyond the scope of this address to detail the nature or to quote examples of these difficulties. They are only too familiar to all who have to deal with such cases; and unfortunately experience of the most extensive character is unable to provide a certain solution of each particular example as it occurs. The most eminent engineering and geological experts have sometimes found themselves at fault; and the utmost that can be done in many instances is to experiment with every available and promising source in turn, until success more or less complete is achieved. Ample confirmation for this somewhat strong statement will be found in the past history and present condition of the water supply in the county of Essex. The latter is fully described in the report of Dr. J. C. Thresh, the County Medical Officer of Health, issued in 1900, and recently revised. My own experience has also provided abundant examples of the serious difficulties which face the water engineer in this part of the country. Fortunately, all underground water schemes are not equally difficult in design or unsatisfactory in result; and I trust I may be pardoned for referring to two examples of deep borings in which I am personally interested, which, being unique as regards dimensions, may perhaps be submitted as representative to some extent of modern practice and experience in this connection.

Boring at Gainsborough.—The first is at Gainsborough, Lincolnshire, and was undertaken by the Urban District Council (then the Local Board of Health) in the year 1894, under the advice of my predecessor, the late Jabez Church. Gainsborough is situated on the banks of the River Trent; the surface formation being red marls (of the new red sandstone series), having a thickness of about 700 feet. The idea of using water from the Trent was first considered, having been strongly recommended by the late Thomas Hawksley; but on the advice of several geologists, a trial boring had been sunk into the Bunter beds (underlying the red marl), and the existence of a large supply of excellent underground water satisfactorily proved. It therefore became a question of selecting one of two sources, both having points of advantage. In the end, my late partner's advice was acted upon, and the new boring commenced. This was completed, after five years' anxious and difficult work, in July, 1900, and now stands of the following dimensions: 12 feet from the surface lined with 36-inch internal diameter cast-iron guide-pipes backed with concrete; thence to 300 feet from the surface lined with 30-inch internal diameter steel tubes backed with cement; thence to 775 feet from the surface lined with 18-inch internal diameter steel tubes, also backed with cement; thence to 1065 feet from the surface lined with 15½-inch tubes, partly perforated; and thence to 1515 feet from the surface open boring 15½-inches diameter. The work was carried out by Messrs. E. Timmins & Sons, Limited, of Runcorn, at a cost of £6645. The trial boring, which is situated on the same site, and is only 1350 feet deep, terminating 10 inches in diameter, yields 25,000 gallons per hour; and when pumping from a depth of 200 feet, the water falls to 100 feet from the surface. It is therefore confidently anticipated that not less than 60,000 gallons per hour will be obtained from the larger boring, in which the pumps will be fixed at a depth of 300 feet from the surface. The machinery is now in course of construction; and though it presents some elements of novelty, I would prefer to leave any description of it until the working results can also be given. The work should be completed during the ensuing spring; and I shall then be only too glad to afford any member of the Society facilities for inspecting it. The fact that the new boring is the largest constructed for water-works purposes in this country, or I believe in the world, must be my excuse for referring to it on this occasion.

Boring at Lincoln.—The second boring to which I have referred is for the city of Lincoln, and was only recently commenced. It may be considered as having been undertaken more or less in consequence of the success obtained at Gainsborough; being intended to tap the same strata. Lincoln is, however, some 20 miles S.S.E. of Gainsborough; and as this is transverse of the "dip" of the strata, there is no fear of the pumping in one case affecting the water-level in the other. The boring here will have to be carried to a much greater depth (estimated at 2200 feet from the surface), and some 400 feet will be through the lias beds, which are more difficult to operate than the marls or the sandstone itself. The terminal diameter has therefore been reduced to 12 inches instead of 15½ inches, as at Gainsborough; and owing to the greater distance from the outcrop, arrangements are being made to pump from a depth of 400 feet below the surface. The contract for the boring has been let to Messrs. C. Chapman and Sons, Limited, at the sum of £14,605; and a term of four years has been allowed for its completion. At the time of writing, 30 feet of 12-feet diameter cast-iron cylinders have been fixed for the purpose of shutting out the water in the subsoil; and the boring proper is about to be commenced.

Other Borings.—Although I have ventured to describe these borings as representative of modern practice owing to their dimensions, I should very much have liked to refer to a number of other borings in various parts of the country which present features of interest either as regards conditions or results; but my address would attain undue length were I to attempt to do so. I must, however, in this connection call your attention to the growing necessity for obtaining supplies of water from underground sources in districts where surface sources are insufficient, unsuitable, or totally lacking. Underground water is often preferred, owing to its usually excellent quality and extreme purity. Where the water is hard, the process of softening can be applied at such a small cost that it need not be considered a serious disadvantage. The development of geological research and the improvement of deep-well pumping machinery have also contributed largely to the popularity of underground sources.

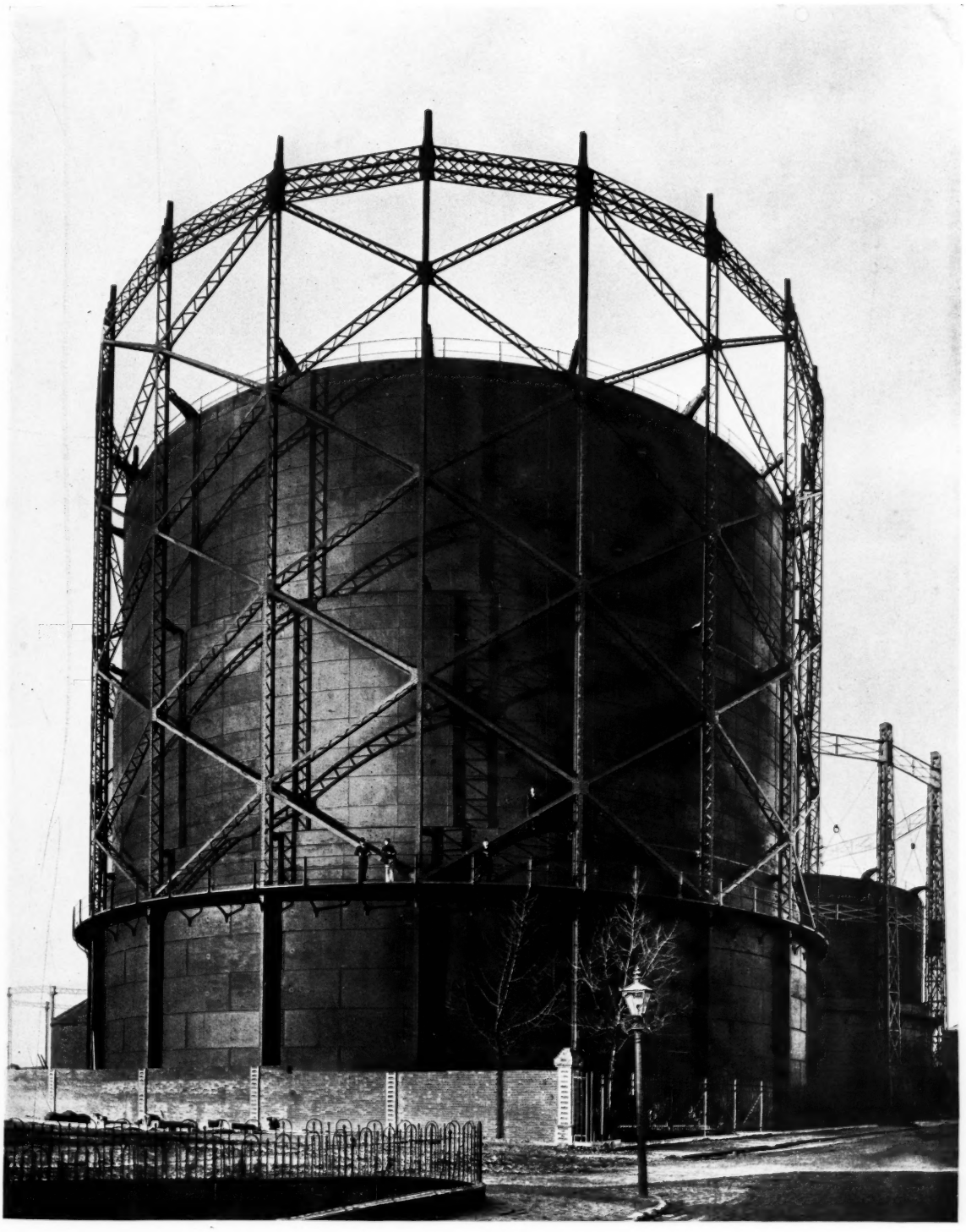
Borings versus Wells.—In regard to the latter, a word may be said on the question of the modern practice of dispensing with wells and drawing the water direct from borings. This has the double advantage of reducing the cost of the sinking and of enabling the water to be drawn from a much lower level, thereby often increasing the supply obtainable.

Borehole-Pumps.—Special attention must, of course, be paid in such cases to the details of the pump, as its inaccessibility for repairs involves a risk of uneconomical working on the one hand, or extensive outlay for repairs on the other. At the same time, where a borehole-pump has been carefully designed, a continuous run of twelve months and more can be secured with no appreciable sign of wear; and it is not therefore necessary to condemn the system as such on this ground. For deliveries over 10,000 gallons per hour, a double-acting "concertina" pump—that is, one barrel superimposed over the other, and the buckets working in opposite directions—is, in my opinion, the most suitable, as no bottom valve or "clack" is required. In the Gainsborough pumps, I have adopted the principle of the "Ashley" bucket with multiple valves, which has been very successfully applied at Brighton and elsewhere. Only in this case I have provided the necessary waterway by enlarging the barrel above and below the working part, rather than by restricting the diameter of the bucket extension. I have thereby obtained a minimum waterway of 90 per cent. of the full area of the pump-barrel.

Air-Lift Pump.—No engineer interested in pumping machinery can have failed to hear of the recent introduction into this country of the system known as the "Air-lift pump;" and as there appears to be a good deal of misconception as to its purpose and working results, I feel justified in making some reference to it.

IPSWICH GAS COMPANY.

(J. T. JOLLIFFE, ESQ., ENGINEER.)



THREE LIFT GASHOLDER WITH STEEL TANK

AND

CUTLER'S PATENT GUIDE FRAMING

· CONSTRUCTED BY ·

SAML. CUTLER & SONS,

CONTRACTING GAS ENGINEERS,

MILLWALL, LONDON.

BOTH THE GASHOLDERS IN PHOTO. WERE CONSTRUCTED BY MESSRS. CUTLER.

LONDON: Printed by WALTER KING (at the office of King, Sell, and Olding, Ltd., 12, Gough Square), and published by him at 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, Feb. 11, 1902.

For some time past, the system has been in constant use in America, mostly in connection with oil-wells; but the credit of introducing it into this country is claimed by Mr. G. Y. Murray, of the British-American Well-Works Company. I have myself inspected a number of installations erected by this firm, all of which appeared to be extremely successful. Other firms have now entered the field, and competition is very keen for this new class of pump. The principle involved is of the most elementary character—viz., by forcing air under pressure to a given depth below the level of the water, an upward flow is produced which affords a supply more or less proportional to the quantity of air pumped into the well or boring. Of course, the very simplicity of the process has induced many people to claim for it the most extravagant and impossible results; but as further experience is obtained, these claims are gradually being discounted, and a clearer insight obtained into the actual facts of the case. After very exhaustive inquiries as to the results obtained from existing installations, I am convinced that, as regards economy, there is no reasonable ground for comparison between the ordinary pump and compressed air. In one case, I obtained a guarantee equivalent to 50 million foot-pounds in water lifted per 112 lbs. of coal; but this was insufficient to warrant the adoption of the system as an ordinary pump giving almost double this duty could be applied equally well to the case in question. Speaking generally, however, it is doubtful whether this guarantee represented the results obtained in ordinary practice, or anything approaching them. It must therefore be assumed that, as matters stand at present, there is no justification for resorting to compressed air in cases where the standard form of pump can be conveniently applied.

Application of Air-Lift Pump.—On the other hand, there are no doubt circumstances to which the system is not only applicable, but where it is an invaluable solution of an otherwise hopeless position—as, for instance, where the water is highly charged with sand or detritus, or where, owing to the fall of the natural water-level, it is impossible to reach it with the ordinary form of pump. In both these cases, the air-lift pump will prevent the necessity for sinking a well or additional boring, the cost of which might be prohibitive and involve the abandonment of the supply altogether. Another case where the system is exceedingly useful is where the supply can only be obtained from a number of underground sources, each representing but a small proportion of the total required. Here the necessity for a number of isolated pumping-stations is avoided; the power plant being confined to the air-compressing station, which may be situated in any convenient spot within the area of the supply. By this means, not only is the cost of the steam or motive power reduced, but the land required to be purchased is practically confined to one small site for the compressing machinery, instead of a number corresponding to the number of wells or borings. With some waters, it is also a great advantage to have them aërated; and this is effected very thoroughly where compressed air is used for lifting. The air-lift system has been applied very successfully at the Pembury pumping-station of the Tunbridge Wells Corporation Water-Works, and at a number of private wells and borings in London and elsewhere. A large plant is in course of erection for the Birkenhead Corporation Water-Works. The test pumping at the Dartford pumping-station of the Kent Water-Works Company was also carried out by a similar plant. Owing to the small cost of the plant, it is very suitable for testing the yield of borings; but at the present time there is a difficulty in getting air-compressors of any magnitude on hire for this purpose. As the system becomes more generally used, this difficulty will no doubt be overcome.

There are, of course, many other branches of the all-important subject of water supply which might be referred to with interest on account of the advances now being made in them; but I feel that, on the one hand, I have detained you rather long with the few points I have attempted to deal with, and, on the other hand, I do not wish to appear in any way to be invading the ground covered by that kindred body, the British Association of Water-Works Engineers.

Mr. MASON said it was his pleasant privilege to propose a very hearty vote of thanks to Mr. Griffith for his address. It was an unwritten law of the Society (as it was of many others) that the Presidential Address should not be discussed; but the President had given them ample food for reflection when they left the room. He had been very much interested in the portion of the address dealing with the water question; and he trusted that during the present year they might have some papers submitted dealing with this subject. Mr. Griffith had had great opportunity of proving himself capable in the two branches of engineering which he had touched upon; and it was the experience he had had that so well qualified him to fill the chair.

Mr. GOODWIN, in seconding the proposition, remarked that, if it had been allowable to discuss the address, they would not have differed with the author in the views he had expressed. The President had whetted their appetites, and created a desire on their part to know more of what was in his mind at the present time.

The PRESIDENT said the enthusiasm with which the vote of thanks had been accorded was very gratifying to him. He hoped that this might be an augury of the support awaiting him at the hands of the members during his year of office.

PURIFICATION AND STERILIZATION OF WATER.

The third of the Cantor Lectures on the above subject was delivered at the Society of Arts on Monday, Jan. 27, by Dr. RIDEAL, F.I.C. He dealt with the mechanical, or American, system of filtration, in which the water is usually first treated with coagulants, or substances producing more or less flocculent precipitates entangling suspended solids, combining with colouring matters, and also forming an artificial straining layer on the top of the sand of a rapid filter, similar to the natural top-slime of an English slow sand filter. The action of alum, sulphate of alumina, and iron salts was explained, and also the bacterial improvement which results from softening with lime. It was pointed out that the use of this material, with or without an alumina salt, as a coagulant in the storage reservoir, prevents the danger of lead being dissolved from pipes, and also enables subsequent sand filtration, if required, to be more rapid. The extension of mechanical filters to Moscow, York, and Wolverhampton was mentioned, and the apparatus described; and a table was given of their bacterial efficiency in America, as obtained by a number of observers. The lecturer remarked that the system is worth further trial in this country, as recent practice has been to do away with the sand-filtered supplies from rivers, and to go to the mountain and upland surface waters, many of which, containing vegetable colouring matter, are very amenable to this treatment. But while both slow sand-beds and mechanical filters, in good condition and under favourable circumstances, occasionally remove all bacteria, such a result cannot be depended upon, and to attain it a much finer medium must be employed.

With regard to filters, Dr. Rideal stated that the large number of those formerly trusted have been proved unsafe by many researches; and the only form that has stood all tests is the Pasteur-Chamberland. Sterilizing filters for various uses were illustrated, and a recent improved form of the Berkefeld filter was shown. It was proved that rapidity was quite secondary to security. The lecturer gave instances, from his own experiments and others, of the frequent discovery of pathogenic organisms in the waters of the London Companies, and advocated the sterilization in each house of a portion of the public supply—probably about a gallon per head per day would, he said, be sufficient—for food purposes; less trouble being taken with the water for ordinary use. The required apparatus should be furnished as an integral portion of the water-fittings, and its efficiency secured by official inspection. The expense would bear no comparison with the loss occasioned by water-borne disease. He suggested that the water companies might let out the apparatus and provide attention; but that in cases of municipal supply it could be put in free to the householder and regularly inspected.

The concluding lecture, delivered on the 3rd inst., was devoted to the sterilization of water by heat and chemical methods. Dr. Rideal explained that boiling, though efficient for purification on a small scale, is too costly for large quantities; moreover, the taste of such water is flat, from the absence of dissolved gases. A successful heat sterilizer must, therefore, not only yield water which is bacterially pure, but also one possessing the natural flavour and gases. At Tsaritsin, on the Volga, such an apparatus is employed to sterilize the water for a population of 10,000. The great difficulty in heat sterilization is the deposition of salts from hard waters; and more recently the purification has been effected by apparatus in which the water is brought to the boiling-point, when it at once passes over a weir into the temperature exchanger. The Forbes sterilizer, which is of this type, has been used in the field by the United States War Department. With this plant, it is claimed that the cost of sterilization per million gallons is only from 13s. 9d. to 14s., including interest on the capital spent on plant and the expense of fuel and labour. An English firm produces a sterilizer—the Lawrence—which acts on the same principle; and this is now being tested for use in the British Army. The lecturer remarked that the difficulty of providing fuel in some campaigns must seriously militate against the general adoption of heat sterilizers for army uses, and that for such purposes the advantage lies in filtration, or some form of chemical sterilization.

Dr. Rideal went on to say that oxidizing agents have generally been favoured for the purification of water; but, as he had previously shown, oxidation is only a part, and not the most essential one, of natural purification. Such substances, moreover, are largely consumed, before they can act on the bacteria, by easily oxidizable bodies which may be physiologically harmless. He mentioned the ur reliability of potassium permanganate, confirmed by his own experiments. Ozone has been used for public supplies on a large scale; and it promises to be further extended as a "finisher" in water sterilization. Peroxide of hydrogen, sodium peroxide (which generates hydrogen peroxide when dissolved, and also acts as a softener), and the chlorine group were discussed, together with many acids, bases, and salts which have been put forward as sterilizing agents; and their germicidal power was given for various conditions. The outbreak of enteric fever among the troops in South Africa led the lecturer and Dr. Louis Parkes, in the autumn of 1900, to institute experiments as to the most effective chemical method of destroying the *bacillus typhosus* in drinking water; and, after trying numerous reagents, they found that bisulphate of soda best fulfilled the purpose. This salt has been supplied to the men of the New Zealand contingent engaged in the war; and Professor Firth, of

Netley, who is responsible for the hygiene of the British forces in South Africa, after making several experiments, has satisfied himself that it is eminently adapted for the use of armies in the field, and that its judicious use would help to diminish water-borne typhoid and cholera.

At the close of the lecture, a vote of thanks was accorded to Dr. Rideal for the able way in which he had dealt with a subject of special interest at the present time.

REGISTER OF PATENTS.

APPLICATIONS FOR LETTERS PATENT.

2085.—Purves, J. A. & W. T., "Production of combustible gas." Jan. 27.
2134.—Pehu-Montarou, P., "Acetylene generator." Jan. 27.
2161.—Lake, H. H., "Supplying illuminating gas under pressure." A communication from "Selas" Gesellschaft Mit Beschrankter Haftung. Jan. 27.
2249.—Seymour, J., "Mixing gas and air." Jan. 28.
2276.—Seymour, J., "Mixing gas and air. Jan. 28.
2298.—Thompson, W. P., "Rotary drum gas-meters." A communication from La Compagnie pour l'Eclairage des Villes et la Fabrication des Compteurs et Appareils Divers. Jan. 28.
2299.—Thompson, W. P., "Incandescent gas-burners." A communication from E. Will. Jan. 28.
2312.—Reynolds, J., "Automatically lighting and extinguishing street-lamps." Jan. 29.
2322.—Lane, H., and Schill, C. H., "Blowing or compressing air and gases." Jan. 29.
2339.—Thorp, T., "Enabling the volume and rate of flow in gas-mains to be indicated; applicable also for temporarily stopping and diverting the flow." Jan. 29.
2343.—Yates, H. J., and M'Neill, D. R., "Cooking-stoves heated by oil, gas, or electricity." Jan. 29.
2350.—Short, W. J., "Attachment of incandescent burners to gas-brackets." Jan. 29.
2374.—Forbes, Sir C. S., Acetylene gas-generators." Jan. 29.
2375.—Pataky, C., "Acetylene gas-generators." Jan. 29.
2403.—Salsbury, H., "Acetylene generators." Jan. 29.
2416.—Blakey, J. W., "Anti-vibration devices for incandescent gas-burners." Jan. 30.
2417.—Musgrave, B., "Gas and oil engines." Jan. 30.
2456.—Godwin, A. H., and Keil, F. A., "Treating spent gases resulting from the manufacture of sulphate of ammonia, for the recovery of the cyanogen group contained therein." Jan. 30.
2457.—Mitchell, F., "Incandescent gas-burners." Jan. 30.
2483.—Vert, H., "Generating acetylene gas." Jan. 30.
2501.—Normansell, T., "Anti-vibrator for incandescent mantles." Jan. 31.
2537.—Helps, G., "Anti-vibrator fittings for incandescent gas-lights." Jan. 31.
2541.—Borner, F., "Preventing breakage of incandescent gas-light." Jan. 31.
2589.—Fowler, R. H., "Internal combustion engines." Jan. 31.
2615.—Grieve, G. K., and Peebles, W. C., "Prepayment meters." Feb. 1.
2617.—Dempster, R. and Sons, Ltd., and Broadhead, J. W., "Retort-houses for inclined gas-retorts." Feb. 1.
2649.—Barralet, T. E., "Automatic gas boiler." Feb. 1.
2651.—Youlten, W., "Cooking-stoves." Feb. 1.
2655.—Meier, G., "Gas-lighting devices." Feb. 1.

At the meeting of the Wood Green District Council on the 29th ult., the Surveyor submitted a letter from Moffatts, Limited, asking to be allowed to fix a No. 704 pillar lamp for free trial in the district. The Surveyor said he had suggested that the trial should be extended to 28 days, and that the lamp in question should be placed at the junction of Station Road and Lordship Lane; the whole of the cost to be borne by Moffatts. The Council adopted the recommendation of the Committee that the application should be agreed to.

Referring to Mr. F. G. Newton's letter on "Profit-Sharing in Gas-Works," in last week's "Journal," Mr. Livesey asks us to point out that this expresses (in a much better manner than he himself could do) his views on the question of profit-sharing in gas-works. No system of profit-sharing, Mr. Livesey says, can expect or deserve permanent success unless it has for one of its main and equal objects the real good of the workman. In fact, the other main object is also really for his good. To give him an interest in his labour is a benefit, because it tends to make him happy in his work.

From Tuesday to Friday last week, the whole of the managers and representatives of the Richmond Gas Stove and Meter Company, Limited, assembled at the Plymouth branch of the Company for the purpose of discussing and talking over the business of the concern for the last six months, and considering openings, competition, and new forms of advertising. Three years ago, when the first of these novel "conventions" were inaugurated, the number of delegates was 11 only. Succeeding conferences saw the number grow to 18, 21, 24, and 26 respectively; but with recent promotions and the acquisition of the dry and wet meter businesses, the number attending last week's deliberations was increased from 26 to 31. It is by such enterprising methods that the business of the Company has grown by "leaps and bounds." The Chairman (Mr. E. W. T. Richmond) believes in individual responsibi ity, both inside and out, and genuine co-operation between employers and employed. Numerous subjects were discussed; but one of the most interesting items on the *agenda* is generally voted to be the distribution of bonuses and prizes earned. The amount of prize-money distributed (for the opening of new accounts, largest lump-sum increase, and largest percentage increase) was £148. Altogether, the meeting was voted one of the most interesting and profitable yet held.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by correspondents.*]

The Trend of Gas Invention.

Sir,—Let us cease our funning, and take this matter up in a proper spirit. The writer of the article states seriously that, in the matter of inclined retorts, English engineers have left Continental practice far behind. He would naturally not make this assertion without being perfectly cognizant of the practices of both peoples. Now I will, in accordance with his suggestion, prepare you an article, accompanied by detailed working plans of a Continental retort-house fitted with inclined retorts, showing methods of setting, details of generators, weights of ironwork, &c., &c., for publication in the "Journal," on condition that one of your engineers comes forward with a similar set of drawings, showing in detail a typical English retort-house fitted with inclined retorts, and giving the same details as I propose to give. This is a fair challenge?

No! Mr. "Writer-of-the-Article" I am not yielding to the blandishments of the people of other nations, neither do they need *my* services to bolster up their reputations as you are good enough to opine. And if ever I blessed Providence for the privilege of being an Englishman, I do so more than ever in these parlous times. But I should be an ungenerous "muddied oaf" indeed if I withheld my respect, admiration, and testimony to the outcome of the busy brains working around me. To remark, as the writer of the article does, that I only look at the *drawbacks* of the English systems, and will not see their *good* points, is, I think, a little ungenerous, and unworthy of the writer. I am in a position to judge of the work of *both sides;* and if I have taken up the cudgels, believe me it is not that I wish to deprecate, for one moment, the excellent British work, of which I am thoroughly cognizant and of which, as an Englishman, I am proud, but merely, in all fairness, to question the assertion that your engineering practice is far ahead of that practised on the Continent.

F. D. Marshall.

Copenhagen, Feb. 6, 1902.

P.S.—Regarding the actual length of retorts. The original lengths, of which we have at the Frederiksberg and Odense works 216 retorts in use, are (translated from metres into English feet) exactly 11 ft. 5 in. through the central axis. Since then we have erected at the Frederiksberg, Strandvei, and Randers works 180 retorts; and these are 15 ft. 9 in., through the central axis, long. We have thus 396 retorts working on the inclined system; but with the projected new works at Aalborg and Flensborg finished, our total number will be 589. By the way, I understand that the new works at Slough are putting in 15 feet inclined retorts. Is this an advanced or a retrograde movement?

[It is difficult to understand why 15-feet retorts are going to be put in at Slough. The house, it is understood, is well adapted for 20-feet ones. Yet it has been decided to build six beds of six 15-feet retorts; while five beds of six 20-feet long would have given a greater carbonizing area, at, we should fancy, a lower capital outlay and reduced working cost.—Ed. J. G. L.]

Welsbach Lighting.

Sir,—Mr. F. D. Marshall, of Copenhagen, tells us in your last number that the cost of producing a Welsbach mantle amounts to about 1d.; and consequently the Welsbach Company would readily be in a position to sell them to the gas companies at 3d. apiece.

We do not know at present whether Mr. Marshall, by these Welsbach mantles which he could produce at a price of about 1d., means merely impregnated mantles, or whether he means collodionized mantles ready for use. In the latter case, we should be very pleased to receive from Mr. Marshall the estimate for the production of such a collodionized mantle.

It is a pity that such stories—to use no stronger expression—are given to the world, and the trade thereby completely misled. If a collodionized mantle could be produced for 8 pfennige (1d.), the demand for a cheapening of the mantle would, of course, be justified. As, however, the cost of producing a collodionized mantle, inclusive of all workers' wages, and broken and rejected goods, comes out very considerably higher, it is incumbent on the manufacturers concerned to make a stand against such stories as Mr. Marshall's. If communications of this kind are made by a reputed specialist, it is not to be wondered at if customers and buyers constantly make greater demands on the manufacturers, who are not in a position to satisfy them. The prices at which mantles are sold in Germany, as well as in England, leave the mantle manufacturer, wherever he may be, only a profit of quite a few pfenninge. Consequently, at the present time even, many of the smaller people have given up the manufacture; and only a few of the larger firms, whose output is counted by millions of mantles, can reckon on some measure of profit.

While far from taking up any position on the Welsbach question, we must, however, explain that it could not be possible for this Company to sell collodionized mantles at 3d. each, and thereby obtain a profit of 2d. If the Welsbach Company were forced to sell at 3d., they would at the very utmost have a profit of from ½d. to ¾d. The Company cannot work on this profit.

We should therefore like to ask Mr. Marshall to give some elucidation of the cost of production mentioned by him, and not to publish to the world, under the guise of an expert in such matters, stories which perplex the trade.

We ask you kindly to be good enough to give our views in your "Journal," as thereby you will undoubtedly be doing a good service.

Berlin Incandescent Gas-Light Company, Ltd.,
Late Richard Feuer.
(Berliner Gasglühlicht-Gesellschaft m. b. H., vorm. Richard Feuer.)

Berlin, Jan. 30, 1902.

[The foregoing is a translation of the letter addressed to us.—Ed. J.G.L.]

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills presented and read the first time: Margate Corporation Water Bill, Whitstable Improvement Bill.

Bills presented, read the first time, and referred to the Examiners: Bradford-on Avon Gas Bill, Swindon United Gas Bill, Weardale and Shildon District Water Bill.

Bills read a second time: Abertillery Urban District Council Bill, Birmingham Corporation Water Bill, Bradford Corporation Bill, Bristol Water Bill, Buxton Urban District Council Bill, Chigwell, Loughton, and Woodford Gas Bill, Darley Dale Water Bill, Deal and Walmer Gas Bill, Devonport Corporation (Water) Bill, Devonport Water Bill, Leicester Corporation Bill, Longwood Gas Bill, Menai Bridge Urban District Council Bill, Nottingham Corporation Bill, Rhondda Urban District Council Bill, Street Urban District Council Water Bill, Swansea Corporation Water Bill, Ystradfellte Water Bill.

HOUSE OF COMMONS.

Wednesday, Feb. 5.

PRIVATE BILL LEGISLATION.

Mr. RENSHAW asked the First Lord of the Treasury whether, in view of the proposed new rules of procedure in regard to public business, he would appoint a Select Committee to report what changes it was desirable to make in the Standing Orders for private business, in order to facilitate the earlier introduction and progress of Private Bills; and also whether he would consider the desirability of appointing a Joint Committee of the two Houses to report on the whole question of Private Bill Legislation, and the fees charged in respect of Private Bills.

Mr. BALFOUR: The honourable member suggests the appointment of two Committees, running more or less concurrently, on the subject of Private Bill Legislation. I quite understand the objects of my honourable friend; and I sympathize with them. But I cannot help thinking that they would be better attained if, in the first instance, this House and the other House consented to a Joint Committee to discuss Private Bill Legislation; and if the inquiry promised to be of so prolonged a character as to prevent our making the necessary arrangements to adapt Private Bill Legislation to the new rules, if the new rules are passed, then perhaps the course suggested by my honourable friend might with advantage be adopted.

Mr. RENSHAW asked when the Committee was to be appointed.

Mr. BALFOUR: I indicated in my speech in introducing the new rules that, in my judgment, it would be desirable to have a Committee to inquire into the Private Bill Legislation of this House. If the view I expressed is shared by this and the other House, I think the sooner such a Committee is at work the better.

The following further progress has been made with Bills:—

Bills presented and read the first time: Huddersfield Corporation Bill, Leamington Corporation Bill, London Water (Purchase) Bill, Wolverhampton Corporation Water Bill.

Bills presented, read the first time, and referred to the Examiners: Reading Gas Bill, Shepton Mallet Gas Bill, West Ham Gas Bill.

Bills read a second time and committed: Abercarn Urban District Gas Bill, Bedford Corporation Water Bill, Belfast Corporation Bill, Birkenhead Corporation Bill, Finedon Urban District Water Bill, Higham Ferrers and Rushden Water Board Bill, Knaresborough Improvement Bill, Newport Corporation Bill, Omagh Urban District Gas Bill, Ticehurst Water Bill, Tipton Urban District Council Bill, Wadhurst Gas Bill.

Petitions have been presented against the following Bills: Grand Junction Water Bill, Huddersfield Corporation Bill, Kent Water Bill, Liverpool Corporation Bill, London Water (Purchase) Bill, South Metropolitan Gas Bill, Ticehurst Water Bill, West Ham Gas Bill.

On the second reading of the London Water Bill, Dr. Macnamara will move: "That no Bill for the transfer of the undertakings of the London Water Companies will be satisfactory which does not provide for purchase by the London County Council exclusively, and representation by co-optation to the London County Council Water Management Committee of such extra-Metropolitan areas with the area of supply as may seek such representation."

Sir F. Dixon-Hartland and Mr. Whitmore have given notice that they intend to move the rejection of the London Water Purchase Bill.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE.—CHANCERY DIVISION.

Friday, Feb. 7.

(*Before Mr. Justice* SWINFEN EADY.)

Husey v. The Gaslight and Coke Company.

This was a motion which came before the Court under circumstances reported in the "JOURNAL" last week (p. 285); and it was treated as the trial of the action.

Mr. H. T. EVE, K.C., and Mr. MITCHELL appeared for the plaintiff; Mr. DANCKWERTS, K.C., and Mr. AUSTIN CARTMELL represented the defendants.

Mr. EVE said he had to move the Court for an injunction to restrain the defendant Company (according to notice of motion), until trial or further order, from taking any proceedings by way of cutting off or discontinuing the supply of gas from their mains to the premises known as the St. Ermin's Hotel and Mansions, Westminster, and other premises owned by the Mansions Proprietary, Limited, of which property the plaintiff had been appointed Receiver on behalf of the debenture holders, who, under an order made by his Lordship, had gone into possession. The order was made on Jan. 17; and what the plaintiff now wanted was to get a supply of gas without paying the arrears due. He had agreed to pay for all gas consumed from the date of taking possession; but unfortunately at that time there was a sum of £429 1s. 10d. owing to the Company for gas consumed during the preceding quarter, as well as a further amount for gas supplied between the end of that quarter and Jan. 17. Of this, £269 18s. worth was supplied to the hotel, and the residue to the other premises—the largest item being £91 odd for the Marlborough Mansions. The Gas Company claimed that plaintiff must pay these arrears before he could ask them to continue the supply; and on Jan. 24 they served on him a notice, addressed to the Company, saying that, unless the arrears of £429 were paid on or before the 28th, the supply to the premises would be discontinued; and adding that, as the man who would cut it off had no authority to receive the money, the Gas Company would not be responsible for whatever might happen if the money were not paid promptly to them.

His LORDSHIP: Then the question really is whether, on the facts, you can escape from the decision of the Court of Appeal in *Paterson v. Gaslight and Coke Company* by saying that there was an order to give up possession.

Mr. EVE said it was partly that; and further his Lordship would find, when they came to consider the *ratio decidendi* in that case, the facts were different, and the Receiver and Manager who was there, was there as an agent of the Company. That was not the basis in this case, because the Receiver here was in possession on behalf of the debenture holders. The debenture holders were mortgagees by way of demise; and the Receiver was in possession under a tenancy created by the demise which was made to the trustees under the debenture trust deed.

His LORDSHIP asked whether any distinction was drawn between the the hotel and the rest of the premises.

Mr. DANCKWERTS replied that there was a distinction on the face of the receivership order.

His LORDSHIP: Apart from the hotel, the rest of the premises are flats?

Mr. EVE: Yes; they are premises in respect of which there are various tenants in occupation.

His LORDSHIP: But as between you and them, you have to pay the gas bill.

Mr. EVE: Yes. The contract was between the Gas Company and the Mansions Proprietary, Limited.

His LORDSHIP: I want to see how much of the property is affected by the expression in the Act relating to the incoming tenant.

Mr. EVE read the affidavits in support of the plaintiff's motion, and said, of course, so far as the flats in question were concerned, the Receiver had not gone into actual physical residence, but was only the receiver of the rents and profits of the property. Section 16 of the Gas-Works Clauses Act, 1847, gave them power to cut off the supply if arrears of rent were not paid; and section 18 of the Gaslight and Coke Company's Act of 1872 said: "In case any consumer leaves the premises where gas was supplied to him without paying to the Company the rate or meter-rent due from him, the Company shall not be entitled to require from the next tenant of the premises payment of the arrears so left unpaid by the former tenant, unless such incoming tenant has agreed with the defaulting consumer to pay the arrears." The first point he submitted on this section was this: He said the Receiver was the next tenant, who had been substituted for the consumer who was liable to pay the rate, and had neglected to do so. He was the next tenant within the meaning of this section, in contradistinction to the defaulting consumer. When the defaulting consumer went away, the Company were not entitled to say that the person who took his place must pay the arrears of the defaulting consumer as a condition precedent to the supply of gas. In this case, it happened that the consumer was not the tenant in one sense of the word; he was some third party who, by contract with the occupier, made himself liable to pay for the gas. The position of the person who had taken the place of the defaulting consumer was not to be measured by the relationship between the defaulting consumer and the Company. It would be idle to say that the next tenant was not entitled to a supply through the fault of the outgoing tenant, or that he was liable in such a case as the present, where the premises were divided into flats and the gas was supplied to the property as a whole. What he suggested was this: The mortgagee who went into possession of his security became, by going into possession, a new tenant of the premises under the demise in his mortgage deed. He was not even in the position of an assignee. He was holding by a totally new title; and he became liable under a totally different tenure. That being so, what difference did it make if the mortgagee, instead of going into possession himself, allowed others to enforce the security in his absence by the appointment of a Receiver?

His LORDSHIP: On the other hand, if there were tenants in possession, that would not make him a tenant in possession.

Mr. EVE said it would not make him a tenant in the sense of physical occupation; and in one sense he would be a landlord in relation to those holding under him. But, on the other hand, the landlord was himself in turn a tenant. If the mortgagee by his demise on going into possession became, so far as the people over him were concerned, a new tenant, then he became a new tenant; and the moment he went in, he had a right to demand from the Gas Company a supply of gas to his premises. If he were entitled to the supply as a new tenant, then he was equally entitled to the protection of section 18. The second point of his argument was this: Assuming it to be the fact that the mortgagee going into possession in the way he had indicated became a new tenant, then he suggested that the mere fact that he took possession under circumstances which protected him as against the mortgagor did not really increase his liability, or the liability of the agent by

whom he took possession, beyond what would have been the mortgagee's own liability. Here, no doubt, it would be said that the mortgagees did not go into possession. They elected to go to the Court and take possession by means of a Receiver; and the suggestion was that, having done this, they would be in a worse position than had they taken possession under their mortgage security. He contended that the mortgagee, however he was in possession, was, so far as third parties were concerned, in possession, and nothing more. With regard to the hotel, there had been a complete dispossession. The Company were the occupiers of the hotel, and had been by order of the Court directed to vacate it with possession and occupation alike to the mortgagee.

His LORDSHIP: I do not find any such direction. All that it says in the order is to deliver up possession so far as is necessary for the purposes of the receivership.

Mr. EVE said the delivery up of possession involved the retirement of the person who delivered up possession. He agreed it was qualified; but must this not be read in connection with the different nature of the various premises? So far as the hotel was concerned, the object was to put an end to the possession and management by the Company, and to substitute for it possession and management by the mortgagees. There had been such a change of possession as was contemplated by section 18; and the mortgagees had become new tenants of the hotel within the meaning of the section.

Mr. DANCKWERTS said there must be an absolute change of occupation before his learned friend's point could arise at all. Here the order was that the mortgagees were to take possession so far as it was necessary for the purposes of the receivership. He was rather surprised at the plaintiff pressing this motion, because the previous day the same plaintiff had the very question decided against him by the Court of Appeal with regard to electric lighting.

His LORDSHIP said he need not trouble Mr. Danckwerts further. This was a motion on behalf of the plaintiff in an action brought against the Gaslight and Coke Company to restrain them from cutting off or discontinuing the supply of gas to the premises known as St. Ermin's Hotel and Mansions, and other premises described in the notice of motion. These premises belonged to the Proprietary Mansions, Limited, who had issued debentures and sub-demised the premises to the debenture trustees. They had not entered into occupation of the premises under their trust deed; but an action was brought by certain debenture holders asking for the appointment of a Receiver and Manager, and by an order made on Jan. 17, the plaintiff was appointed Receiver on behalf of the debenture holders of the property comprised in the mortgages. A Manager was also appointed. The order provided that the defendant Company should deliver over to Husey, as Receiver, possession of the premises so far as was necessary for the purposes of the receivership and managership. It appeared that on this date —Jan. 17—the sum of £429 1s. 10d. was owing by the Mansions Proprietary, Limited, to the Gaslight and Coke Company for gas supplied down to the end of December. The plaintiff, as Receiver, claimed to be entitled to a supply of gas for the premises in respect of which he had been appointed Receiver, without paying the arrears. The Gas Company, on the other hand, gave notice that, unless the arrears were paid, the supply to the premises would be discontinued; and it was to prevent this that the action was brought. The question was whether the plaintiff was entitled to restrain the Company from discontinuing the supply, and compel them to continue it without paying the arrears. With regard to all the premises comprised in the security other than the hotel, it did not appear that the Receiver had entered into possession or occupation of any part of them. There was no evidence to show how the properties were held. They were stated to be flats, let out to tenants; and it was not suggested that plaintiff was in actual occupation of any of the premises. With regard to the plaintiff, it was said that he was entitled to claim a supply as owner, if not as occupier; but as had been pointed out before, there was no section of the Gas Company's Act which entitled an owner to require a supply of gas when arrears for supply to the same premises remained unpaid. Under section 16 of the Gas-Works Clauses Act, 1847, "if any person supplied with gas by virtue of this or the Special Act neglect to pay the rent due for the same to the undertakers, the undertakers may stop the gas from entering the premises of such person by cutting off the service-pipe, or by such means as the undertakers shall think fit." Now it was not disputed that there was a large amount owing; and under the section, if there were nothing more, the Gas Company were entitled to stop the supply. But under the Gaslight and Coke Company's Act of 1872, there were provisions with regard to an incoming tenant and an outgoing tenant; and in a certain case it was provided that "the Company shall, notwithstanding any such arrears, in the absence of collusion between the outgoing and incoming tenant, supply gas to the incoming tenant as required by this Act on being required by him to do so." But, with regard to an occupier, there was no similar provision. In his judgment, the plaintiff, as regarded the premises other than the hotel, was not in the position of an incoming tenant, and was not entitled to require a supply to the premises while large arrears remained unpaid. It was pointed out by Lord Justice Lindley, in *Paterson v. Gaslight and Coke Company*, that the sections relied upon as entitling the plaintiffs to require a supply simply as occupiers contained nothing which negatived the right of the Gas Company to withhold such supply until payment of the sum due for gas previously supplied to the premises. The two sets of sections must be read together. The general right of an owner or occupier to require a supply was limited by the right of the Gas Company to refuse a supply in certain specified cases. In other words, the right of an owner to require a supply did not extend to a case in which the gas bill was already in arrear in respect of the same premises. The next question was as to the hotel, and whether any distinction could be drawn with regard to it. As to this, though there was no evidence with regard to the exact course which had been taken under the order, it was said that, for the purpose of carrying on the business, the Receiver must be in possession, and that the order had directed possession to be given so for as was necessary for the purpose of the receivership. In his judgment, even assuming that the Receiver had entered and was carrying on the business of the hotel, and was in possession of the premises of the Company, there was not sufficient in that fact alone to distinguish it from the case of *Paterson v. Gaslight and Coke Company*, or to make the Receiver an incoming tenant within the meaning of section 18 of the Company's Act of 1872. In Paterson's case, a Receiver and Manager had been appointed; and it appeared that they had entered and carried on the business of the Company. Nevertheless, the true position of Receivers was pointed out by the Court of Appeal in that judgment. It was shown that they did not occupy the respective position of an incoming or outgoing tenant, as between them and the Company; and the mere fact that the order contained a direction to give possession to them, did not, in his judgment, make any difference to the present case, nor enable any substantial distinction to be drawn between that case and the present. The result was that the plaintiff had not brought himself within the exception in section 18 of the Act of 1872, entitling him to require a supply so long as arrears of rent remained unpaid. He must therefore dismiss the motion with costs.

Mr. EVE asked if the Company would undertake not to cut off the gas while the plaintiff took out a summons to obtain leave of the Court to raise the money to pay the arrears.

Mr. DANCKWERTS: Have you got any money?

Mr. EVE said he could not answer that now.

Mr. DANCKWERTS remarked that the Court of Appeal on the previous day would not interfere. The Electric Lighting Company said they would not give any undertaking; and that was the position he also took up.

His LORDSHIP said, notwithstanding this, he had no doubt the Gas Company would act like reasonable people under the advice of Mr. Danckwerts.

Mr. DANCKWERTS: If we receive reasonable assurances.

His LORDSHIP said he should not grant any inquiry as to damages, though, of course, they would remain liable.

Mr. DANCKWERTS: I will ask your Lordship to say nothing about an inquiry at present.

Mr. EVE: Then the action will be dismissed, upon my undertaking to pay for the gas from January 17.

The action and motion was accordingly dismissed with costs.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Saturday, Feb. 1.

(*Before Mr. Justice* BUCKLEY.)

Acetylene Illuminating Company v. United Alkali Company.

As briefly reported last week, on the resumption of the hearing this morning,

Professor *Ewing* was called on behalf of the defendants. He said he had examined all the documents in the case dealing with the whole of the four patents originally sued upon. The inquiry was now much narrowed. The Siemens arc furnace was a well-known form; and the distinction between an arc and an incandescent furnace was also well known. In his opinion, there was nothing new in putting a powerful current through a mass of lime and carbonaceous matter. A very high temperature was required to melt oxide of calcium and produce calcium carbide. He found nothing in the specification, either in principle or detail, which was novel at the date of the patent. Crystalline calcium carbide had been defined at this date, and its formula (Ca_2C) given by Moissan, and its properties described. Several furnaces were known which would produce it. Neither claim 1 nor claim 2 referred to anything new. The latter practically described a Siemens furnace. He had carefully examined the patent No. 16,342 of 1894; and it was practically identical with No. 16,705—the one sued upon. He had also examined Willson's American patent of 1892, which was rather fuller than the English one of that year. It pointed out the distinction between an arc and an incandescent furnace, and described a perpendicular arc furnace, in one form of which a double arc was produced; the current going from one pole into the material, and from thence to the other pole—that was equivalent to sending the current through the material. In the same patent, a "toasting" furnace—practically the same as Moissan's—was described as an alternative. The illustrations attached to the specification showed the current passing through the material. The same thing was shown in the illustration of a Siemens furnace. The patent of 1892 expressly mentioned the production of calcium carbide as having been effected by the means described. The Cowles furnace was of an incandescent type, as was clearly shown in the drawing. In such a furnace, there was no arc—there was no space across which conduction was maintained by the vaporization of the material of the poles themselves. It passed through the material, which, being partially conductive, offered resistance; and the passage of the current raised it to a high temperature—probably as high eventually as was obtained by the arc. Provision was made in the Cowles furnace for moving the poles further apart as the material became heated, so that the requisite high temperature might be obtained; otherwise it would fall as the conductivity of the material increased. The defendants used an incandescent furnace. He should not describe it as a Cowles, because it had important alterations in detail. The electrodes were entirely buried in the material. One of them was suspended, and was gradually raised as the operation progressed. The zone of action was more limited than in a Cowles furnace. The bottom pole was the negative; and as the melted calcium carbide formed upon it, it was practically prolonged upwards, and the upper, or positive, pole was gradually raised so as to subject a higher stratum of material to the action of the current. The defendants practically used the form of furnace which Willson rejected in 1892 as unsuitable. The production of calcium carbide was purely a question of temperature. Electrolytic action, in his opinion, had nothing to do with it. With regard to Moissan's papers, he found no indication that any particular form of furnace was excluded. In his view, the reference to an electrical furnace was quite general. An engine of about 40-horse power would be required to produce the current of 350 amperes and 70 volts, such as Moissan used. Moissan pointed out everything necessary for the production of calcium carbide, and described its chemical properties, and the readiness with which it could be used for making acetylene gas. In the

reverberatory furnace described by Moissan, in which the material operated on was placed in a carbon tube, he should judge that a part at any rate of the current would pass through the carbon tube and the enclosed material. In the manufacture of calcium carbide, it was not in any way necessary to exclude carbon vapour, but the contrary. He found nothing new in the plaintiffs' patent. Moissan's process was not necessarily inefficient or wasteful; and he could not see why a "toasting" process should not be used commercially.

In cross-examination, witness said Moissan was famous for his researches. He had written a book entitled "Le Four Electrique." For some of his researches it was important to keep the thermal effect distinct from the electrolytic. He might have claimed to be the first to separate the two actions. A passage from the work cited, making this claim, was read by Mr. Moulton, and witness accepted it. Several passages were then read from the "Comptes Rendus," to show that Moissan throughout his experiments always kept this in view, and relied entirely on the calorific action; but witness would not admit that in all his experiments this distinction was of importance. Crystalline calcium carbide was not first mentioned in Moissan's papers. There was an earlier reference to it by Lord Kelvin; but he (witness) had not heard of it before. There was no reason, on chemical grounds, that he knew of for suspecting that electrolytic action would be unimportant in the production of calcium carbide; that was justified by Willson's 1892 patent. Witness was then cross-examined with regard to the defendants' method of working, with a view to show that they exactly followed plaintiffs' specification, except as to the proportion of lime and carbon. He did not agree, inasmuch as the plaintiffs did not, in his opinion, contemplate piling the material round the carbon pencil, which was contra-indicated by his earlier patents; and it would not constitute an arc furnace. The defendants took particular pains to secure a continuous passage of the material of the charge into the space under the positive electrode, which was caused to have an eccentric motion through the crucible, so that it would continuously pass from the surface on which it had been acting to a new surface. He could not admit for a moment that an incandescent furnace was an arc furnace, though there might be carbon vapour present. There was a broad distinction between the two. The plaintiffs plainly prescribed an arc furnace, which the defendants' furnace was not. The plaintiffs' patent of 1892 was next dealt with. It related almost exclusively to dealing with alumina for the production of aluminium. He proposed to do this by means of an arc furnace, and also said he could apply the invention to other materials. The directions were insufficient, and would need further experiment—at any rate in the case of some of the metals mentioned. The patentee, however, did not refer to the production of pure metals only, but also to their compounds. He said he had used it to produce calcium carbide; and in a sense he had given sufficient directions for producing it, because one could hardly help making it if the materials were submitted to the heat of an electric current.

In re-examination, witness said the defendants did not employ an arc in the ordinary sense of the term.

Monday, Feb. 3.

On the assembling of the Court this morning,

Mr. CRIPPS said it had been decided not to call any further evidence on behalf of the defendants.

Lord ROBERT CECIL then addressed the Court. He submitted first that the patent in question was void, because the second claim was identical both in words and substance with the first claim in the previous patent, which the plaintiffs were not now relying upon. He then proceeded to examine the specification in detail, and submitted that it disclosed no novelty, either in materials used, products employed, or result produced. He referred to several passages in the evidence to show that Moissan had clearly anticipated everything disclosed in the patent. The main principle running through the whole of his papers, so far as they bore on the production of calcium carbide, was that the one thing needful was a sufficiently high temperature. There had been no suggestion, until the case came into Court, that Willson prescribed specifically the passing of the current through the material. If it were true that, on the proper construction of the patent, it referred to a particular form of furnace, there had been no infringement. There were two well-known forms of electric furnace—the arc and the incandescent; and while the patent prescribed the use of the one, the defendants employed the other. The only real invention, as Mr. Swinburne had put it, was the application of a known scientific process to commercial purposes; and he submitted that it was contrary to patent law to grant a monopoly for such a so-called invention.

Mr. MOULTON, in reply, said the whole argument of his learned friends came to this—that Willson had invented the only method of making calcium carbide commercially; but he had bungled in drawing up his specifications. He submitted that the prior patent (Ellis, 1894) was not fatal to the present one, because the grant of the prior patent was invalid, as plaintiffs had admitted, on defendants' objection, that the provisional was insufficient.

His LORDSHIP pointed out that it had been admitted in evidence that the process described in the last patent was the same as in the previous one. If it was now admitted that the previous patent was invalid, must it not be taken that the present one was invalid also?

Mr. MOULTON submitted not, when the grounds of invalidity did not apply. He asserted that in this specification there was no attempt to discriminate between what were popularly called arc, or incandescent, electric furnaces. The inventor had not limited himself to any particular form of apparatus, but merely to the mode of using the apparatus, whatever it might be. The learned Counsel then went into a dissertation on the action going on in an electric furnace, with the view of showing that arc action was always present, even in an incandescent furnace. The patentee claimed the operation of a continuous current at arc temperature through the materials; and this was what the defendants did. Under a narrow interpretation of the second claim, it might be that the defendants did not infringe it; but they would still infringe the first. He then proceeded to deal with the alleged anticipation by Willson's 1892 patent, and submitted that there was nothing in it which taught the public how to make the carbide. Lastly, he dealt at some length with Moissan's papers, which, he said, were notoriously dealing with experiments in which the electric current was not passed through the material, but kept above it, so as to avoid electrolytic action; and he submitted they were not an anticipation of plaintiffs' patent.

Justice BUCKLEY, in giving judgment, said the plaintiffs had brought their action upon four patents of one Thomas Leopold Willson, dated in 1890, 1892, and 1894, but had, at the Bar, abandoned their case as regarded the first three, and proceeded only upon the fourth. The patent in question was for "Improved Metallic Carbides Applicable for Use in the Production of Acetylene, and Means for Producing the Same." The defendants denied validity and infringement, and, in his judgment, succeeded upon both issues; and though he might have disposed of the action on the issue of infringement alone, as the parties desired the benefit of his decision on the point of validity, he would decide that point also. [His Lordship then made a learned examination of the patentee's specification, and also referred to the scientific investigations of M. Moissan in connection with the arc furnace. The whole of this portion of the judgment, however, is of a technical character possessing little interest for our readers, and it is therefore omitted.] Proceeding, his Lordship said it appeared to him that the plaintiffs' case failed because there was no novelty. In other words, they failed on the question of validity. The other issue, on which alone he might have decided the case, was that of infringement. If he was right in his view of the plaintiffs' specification, they used the arc as distinct from incandescent furnaces. Without going into the refinements into which the witnesses had gone, it might be said that, in a sense, every arc furnace was incandescent, and every incandescent furnace was an arc furnace. If he rightly understood the matter, in an arc furnace there were two electrodes in contact, and thereby a certain amount of incandescence was obtained. When vapour resulted, the two electrodes were drawn apart, and they got an arc; the furnace was incandescent before it was arc. If he correctly understood the incandescent furnace, the two electrodes were separated by a considerable distance, and conducting material was put between, and the current passed. The heat thus generated through the carbon, probably—it was not by any means certain—produced vapour of carbon, and the current used that vapour for the purposes of conductivity; and it might be said that the incandescent furnace was a mere agglomeration of a series of minute arcs. But this was not the real distinction between the arc and the incandescent furnace. The question was whether the furnace was so used as to create an arc from one electrode to another. According to the evidence, the defendants never did get an arc at all. They used a carbon pencil with a sectional area at its head of something like 6¼ inches. Between that pencil and the hearth they placed a small piece of carbon, the object of which was to prevent injury to the machinery in starting. They thus got a current through; the materials were piled up round the electrode; no arc was ever struck; heat was generated; and the material becoming heated, the operation was that of Cowles' incandescent furnace, with this variation—that the pencil itself (which constitutes the positive electrode) was not stationary but was kept moving over the hearth, the object being always to maintain between the pencil and the hearth a certain amount of material not yet treated, so as to ensure that the conductivity should be through the material, and not by means of an arc. In the defendants' operation, the arc was never employed except in the sense in which the arc was used in every incandescent furnace. If he was right in his construction of the plaintiffs' specification, there was no infringement in the operation carried out by the defendants. On both grounds, therefore, the action failed, and would be dismissed with costs.

POOLE QUARTER SESSIONS.—Wednesday, Feb. 5.

(*Before* Mr. G. PITT-LEWIS, K.C., *Recorder*.)

Assessment of the Poole Gas-Works.

In the "JOURNAL" for the 13th of August last (p. 399), we reported the proceedings in connection with the appeal by the Poole Gas Company against the rating of their property by the Assessment Committee of the Poole Union. It was contended by the appellants (on whose behalf Mr. W. A. Valon and Mr. Ryde were retained as expert witnesses) that the increase in the rateable value from £1100 to £1900 was disproportionate to any natural development of the concern. Mr. Valon's valuation was £935, and Mr. Ryde's £917; while Messrs. Castle and Fuller, two of the witnesses for the Committee, put the figure at £1912 and £1932 respectively. In the result, judgment was reserved; and it was given to-day.

The RECORDER said that for the information of those who were in authority in Unions and the public generally he thought he was bound to make a few observations upon the matter before him. He negatived the idea in the minds of many ratepayers that by adopting measures with a view to doubling the assessment, they were going to double the ratepayers' burden; and he said that the expenditure was absolutely in the hands of the ratepayers themselves. If the ratepayers came to the conclusion that too much money was spent, they had the power to change their representatives or alter the spending authority that might be. It was obviously very much to the advantage of themselves to raise the money for works of improvement by payments spread over a term of years rather than by means of one heavy rate payable at once. On the other hand, outside ratepayers, financiers who lent money, capitalists, and others, were entitled to have an impartial and fair valuation. Under these circumstances, Judges had condemned in strong terms—and obviously it was undesirable—the practice of the payment of employees by results; and he felt quite sure that the remarks of the Judges were not wholly inapplicable in the present instance. All parties were, he had no doubt, actuated by a desire to do the best they could for the ratepayers on the one hand, and the Assessment Committee naturally endeavoured to obtain full value for the money which they expended. But he thought it would be much better that they should be men who were absolutely impartial; and consequently he hoped that this mode of remuneration would not be adopted again. All professional men were paid for the skill they displayed, and the time they

devoted, and not according to results; and it was the worst form of quackery to pay by results. To prevent possible controversy in the future, he hoped that the Institution of Surveyors would declare a bye-law or regulation which would provide that a man who obtained payment in this manner should be deemed to be guilty of unprofessional conduct. His Honour then entered into the merits of the matter, and instanced the manifold difficulties which he had encountered. It was always the rule to allow 17½ per cent. on the tenant's capital; but, without going into detail, he would say—and people ought to know it—that, in his opinion, 17½ per cent. was a great deal too much. The origin of this arose in the days of the Duke of Wellington; but money had since depreciated, and they had also the chance of a concern not turning out successfully. Although, therefore, they might in some exceptional cases allow 17½ per cent., or even more, he thought that, as a rule, 12½ per cent. was as much as could be expected. Moreover, there was the question as to what ought to be allocated for repairs, which were necessary to maintain hereditaments—the property in question—in the same condition as when let. Different surveyors had arrived at the amount in various ways; but he had gone to the trouble to deal with the matter from his point of view, with the result that he had arrived at the conclusion that the net rateable value of the Gas Company's works should be £1524 a year and the gross value £1894—making an increase of £405 on the old assessment.

Mr. E. R. SYKES, on behalf of the appellants, contended, on the question of costs, that the Assessment Committee had made no effort to meet the appellants with the view to an agreement; and he submitted that it was all very well for the Union who had the rates behind them, but for the Company it was a serious matter.

Mr. R. N. GREEN-ARMYTAGE, on behalf of the Assessment Committee, maintained, on the other hand, that the Committee were, as a public body, acting in the interests of the public. They had been amply justified in their action by the result, and were therefore entitled to costs.

Mr. SYKES pointed out that the Committee had only succeeded in obtaining about 50 per cent. of their increased assessment.

The RECORDER: You have neither of you won altogether. The Assessment Committee asked for too much, and the Gas Company offered too little. That is the whole story. Both parties will pay their own costs. It was then decided that the case should be adjourned until the 10th of April, in order that a proper adjustment of matters might be effected.

UXBRIDGE COUNTY COURT.—Wednesday, Jan. 29.

(*Before His Honour Sir* ALFRED MARTEN, K.C.)

Electricians' Liability for a Gas Explosion.

As briefly reported last week, William Froude, an ex-police sergeant, formerly of 53, Vine Street, Uxbridge, to-day sued the Uxbridge and District Electric Supply Company, Limited, and Messrs. Callender's Cable and Construction Company, Limited, for damages sustained through an explosion of gas on the 25th of November last.

Mr. R. WARREN appeared for the plaintiff; Mr. LEYCESTER represented the defendants.

Mr. WARREN, in opening the case, said that Mr. Froude was a retired sergeant, carrying on business in Uxbridge, and until a short time ago kept a sort of dining-room. It would appear that there were three different sets of people more or less involved in the accident. The Electric Supply Company, acting under a Provisional Order granted by the Board of Trade, had delegated their powers to the other defendants in the action, who were to supply the plant and carry out the necessary works with a view to furnishing the electric light in the district. It was in the course of this undertaking that Messrs. Callender's men, as he submitted, brought about the explosion at the premises of the plaintiff. It was done in this way: In order that the work of supplying the electric light might be carried out, it was necessary to make trenches at different places along the roadway. In doing this, the preliminary step was to drive an iron wedge into the road, to mark out the place where the trench was to be cut; and he would call evidence to show that on the day in question Messrs. Callender's men were outside the plaintiff's shop, and one of them drove an iron wedge into the ground some little distance off. Shortly afterwards, certain members of the plaintiff's family in the shop discovered that gas was escaping; and the plaintiff's daughter went out and called the attention of the men at work to the escape. They informed her that they had sent to the Gas Company to apprise them of it. This was shortly after one o'clock. A little later the smell of gas seemed to be strong in the shop; and the young woman again went out and communicated the fact to the men. This was repeated three or four times throughout the afternoon. Ultimately, at four o'clock, the plaintiff's wife and daughter thought it advisable again to tell the men that the escape was still going on. One of them addressed the plaintiff's wife, and said she had better send to the Company herself. Upon this she sent a note to the office, and informed them of what had happened. So that from the middle of the day until past four o'clock, the men had allowed the escape to go on, and presumably had taken no notice of it. In order that the plaintiff might carry on his business in the shop, he had a fire there all day. It had been burning during the whole of the time the escape was noticed, and nothing had happened. At five o'clock, as no notice was taken of the escape, and as nothing had happened, the plaintiff's daughter lit the burners in the shop window. Soon afterwards there was a loud report, and the whole of the shop front was blown out, and flames were issuing. He would call evidence to show that the escape was caused by the fracture of the gas-pipe by a blow. It was not a question of leakage of the pipe, which was a comparatively new one; and he would also be able to show that this was not the first time this sort of thing had happened in the neighbourhood. He would submit that there had been negligence on the part of the defendants, and that they were liable for the damage plaintiff had sustained.

Blanche Froude, the plaintiff's daughter, gave evidence in support of the preceding statement, and it was corroborated by her mother.

Mr. *A. R. Burch*, the Engineer and Manager of the Uxbridge Gas Company, said he received a complaint at his private house, and went down to Vine Street. His men had already arrived, and were opening the ground. He produced the pipe, which had been fractured and had caused the escape. He had seen Mr. Heelis (Messrs. Callender's Resident Engineer), who said he had sent a man to the gas-works, but he had failed to find them.

Cross-examined: With regard to the depth of the pipe, if it were laid only 4 or 5 inches deep it would be still deep enough for all purposes. This pipe was laid 7 inches deep.

By the JUDGE: One part of gas to eight parts of air was an explosive mixture; a larger proportion of gas would cause a greater explosion.

Re-examined: The extra pressure of gas for the night would be at its maximum at five o'clock.

Thursday, Jan. 30.

On the resumption of the hearing this morning,

William Price, a gas-fitter, said he was sent on the day in question, shortly after five o'clock, to cut off the service at the plaintiff's house. He, with one of Callender's navvies and one of his fellow-workmen, opened the ground, and discovered the gas-pipe was perforated. He had found other service-pipes damaged by the Callender Company previous to this one.

Mr. *W. Froude*, the plaintiff, estimated the damage to fixtures and furniture at £8; to stock-in-trade, £4; and loss of trade, £25.

This was the plaintiff's case.

James Stone, foreman in the service of Messrs. Callender, was then called. He said he was in charge of the gang breaking up the road in Vine Street. He produced one of the wedges which they hammered down into the road to a depth of 6 or 7 inches. There was no possibility of the men knowing when they came to a service-pipe. This particular pipe was at a depth of 4 inches; but in other places they were laid from 12 to 18 inches deep. He should never expect to find a gas service-pipe 4 inches below the surface. If it were 7 inches deep, it would still be too high; but at that depth the wedge would not have damaged it in the manner it did. His attention was called to the escape about 3.10 p.m.; and he first smelt the gas about 4.45. Mrs. Froude sent a boy to the gas-works, and he brought back the message that the gas men could not come that day. He heard the explosion at a few minutes to five.

Cross-examined: He took no steps to ascertain whether or not there was an escape in the house. He was about 20 or 30 yards away at the time of the explosion. He did not go into the premises at all.

Mr. *Heelis* said he was not on the spot at the time of the explosion, but was there about half-an-hour previously. The usual depth for gas-pipes was 1 foot. The remainder of the pipe, after the removal of the fractured part, was 4 inches below the surface. He should never expect, in the ordinary way, to find a gas-pipe only 4 or 5 inches down. The gas pipe was tunnelled under the cement path, leaving a hollow place through which the pipe went.

Cross-examined: The end of the pipe where he measured the depth below the surface was that nearest to the house. A pipe might be laid anywhere below the macadam crust. The position of the gas-meter was sometimes a guide to the position of service-pipes. He had a conversation with Mr. Burch about the position of the gas-mains, and was told that he would be informed as to where they were. The service-pipes would be included. He could not say whether any of his men inquired as to the position of the pipes in Vine Street.

Francis Savory, one of Messrs. Callender's navvies, said he was engaged with the men working in the wedges. The escape was mentioned to him about 2.30; and he reported it to the ganger half-an-hour later. He had not heard anyone else in Vine Street complain of a smell of gas.

Mr. LEYCESTER asked for judgment, on the ground that the plaintiff had failed to show negligence on the part of the defendants or their servants. A second point was that there was contributory negligence on the part of the plaintiff's daughter, who on this occasion was acting as his servant. A public company with parliamentary powers were not responsible for any injuries which might result from their operations, unless negligence could be shown. He submitted that the road was broken up in a proper and reasonable manner—in fact, in the only possible way. That there might be negligence on the part of the Gas Company, he was not concerned to deny, as the pipe was only 4 or 5 inches, or, according to plaintiff's witnesses, 7 or 8 inches, below the surface. Nobody expected to find the pipe in such a position, and therefore there was no negligence on the part of defendants' workmen. There was carelessness on the part of the plaintiff's daughter in lighting the gas in the shop when she knew there had been an escape for some hours. He submitted that, even if negligence were proved against the defendants, the damages claimed were exorbitant.

Mr. WARREN, in reply, pointed out that in the carrying out of works under a Provisional Order, the undertakers were to be responsible for any accident, damages, or injuries any third party might incur, caused by any act or default. He considered that the defendants' men went to work in a reckless manner, instead of making inquiries as to the whereabouts of the plaintiff's meter and of the service-pipe. As to the question of contributory negligence, he held that Miss Froude's lighting of the gas was not so. With regard to the damages, the plaintiff was entitled to more than mere out-of-pocket expenses. He ought to have something for the goodwill of the business which he had lost, and for the inconvenience he had suffered.

His HONOUR, in giving judgment, said that he was of opinion that there was negligence on the part of the Contractors. They knew there were service-pipes between the main and the houses; and they should have had no difficulty in finding out where they were. It was said that plaintiff's service-pipe was too near the surface. He did not consider this was so. It was the business of the defendants to find out where it was. They had the means of doing this, and they should have done it. With regard to the contributory negligence, he did not think Miss Froude acted improperly in lighting the gas. There had, in his opinion, been negligence on the part of the defendants, and no contributory neglect on the part of the plaintiff. With regard to damages, he thought the claim had been exaggerated. The details did not justify him in allowing more than £22, for which amount he gave judgment, with costs.

Supply of Electricity to a Receiver in Possession.

Lords Justices Vaughan Williams, Stirling, and Cozens-Hardy had before them last Thursday, in the Court of Appeal, an appeal from an order of Mr. Justice Kekewich, restraining the London Electric Supply Corporation from cutting off the supply of electric light to St. Ermin's Mansions and Hotel, Westminster (see *ante*, p. 216). The premises were the property of the Mansions Proprietary, Limited, who issued debenture stock to the amount of £75,000, secured on the Mansions and the furniture therein. The defendants supplied the Mansions with electric current; and they claimed to have a right to cut off the supply by reason of the non-payment of £437 due before the appointment of the Receiver. The plaintiff (Mr. Husey) was Receiver and Manager of the hotel on behalf of the debenture stock holders, and had entered on the premises. He argued that the defendants could not cut off the service, although arrears were due, because he was a new owner and occupier, and was entitled to a supply from the defendants. They, however, contended that he must make a fresh application for a supply; and Mr. Justice Kekewich, although holding that a new application must be made, restrained the defendants from discontinuing to serve the premises until such application had been made. This, defendants submitted, would prevent their account being paid. Their Lordships held that, whether the old contract continued or there was a change of occupation, the Corporation ought not to have been restrained from cutting off the supply of current. The appeal was therefore allowed, the injunction was discharged, the motion was dismissed with costs, and the respondent was ordered to pay the costs of the appeal. Mr. P. Ogden Lawrence, K.C., and Mr. Austen-Cartmell appeared for the defendants; Mr. Warrington, K.C., and Mr. C. T. Mitchell were for the plaintiff.

Important Point as to the Recovery of Gas-Rent.

At the Caversham Petty Sessions, Mr. Myles Formby was summoned by the Goring and Streatley Gas Company for non-payment of an account amounting to £16 11s. 6d., for the supply of gas and meter hire from Dec. 31, 1900, to April 1, 1901. Mr. Joseph Hunt, the Company's Manager, said that the gas supply was laid on to defendant's house on Oct. 24. A new meter was put in. Defendant refused to pay when the money was due, and the Company had the meter tested; a certificate being received to the effect that it was correct. If the defendant did not burn the amount of gas registered, he must prove where it went to. Mr. Brain, for the defence, said his client was supposed to have consumed in one quarter 64,906 cubic feet of gas, with a very small stove. Mr. Hunt replied that the supply was to a bungalow with two rooms, and there was no other means of heating the place. For two months of the time the weather was very severe. Mr. Brain objected to the certificate about the meter; remarking that evidence should be called as to that point. He argued that, according to section 11 of the Summary Jurisdiction Act, 1848, proceedings before Magistrates to recover money for gas supplied must be taken within six months from the time of demand for payment. As the present summons was not taken out till Nov. 25, more than the six months had elapsed; and therefore he contended that the Bench had no jurisdiction. The Magistrates agreed, and dismissed the case, with £2 2s. costs against the Company.

London Water Supply.—A special meeting of the Council of the Metropolitan Division of the National Union of Conservative and Constitutional Associations was held at the Constitutional Club, London, on Wednesday—Sir George Fardell, M.P., in the chair—to consider the Bill for establishing a Water Board to manage the London Water Supply. The following resolution, proposed by the Mayor of Islington, seconded by the Mayor of St. Pancras, and supported by several councillors representing the Metropolitan Boroughs, was unanimously adopted: "That this meeting of the Council of the Metropolitan Division of the National Union welcomes the introduction in the House of Commons by His Majesty's Government of the 'Bill for establishing a Water Board to manage the supply of water within London and certain adjoining districts.' It rejoices to find that while, on the one hand, perfectly fair terms are offered to the shareholders of the eight Companies, on the other the interests of the ratepayers are carefully safeguarded, and that in the constitution of the Board His Majesty's Government has recognized the rights of the Metropolitan Boroughs which are inside the water area to be represented, as well as the authorities who administer the outside areas. It also congratulates the Government that, in the constitution of the Board, the burdens and annoyances caused to the ratepayers by local elections have been avoided."

Development of the Derby Gas Undertaking.—In the report of the proceedings at the recent meeting of the Derby Gas Company which appears elsewhere, reference is made to the large increase in the consumption of gas which the Company have lately had. With the present energetic management, the business cannot fail to develop very considerably. As from the commencement of the present year, the Directors have gone into the gas-fitting business, and they maintain mantles and clean incandescent burners at 9d. per quarter. Then, at the beginning of July last, they took up the supply and fixing of gas-engines on the cash or deferred payment system, and reduced to 2s. 3d. per 1000 cubic feet the price of gas used for motive power; and engines of an aggregate of 400-horse power have been furnished. Under the supervision of the Engineer (Mr. J. Ferguson Bell), extensive alterations are being carried out at the Litchurch works. They include an installation of the De Brouwer coke-handling plant, Livesey washers, a tower scrubber, a tar extractor, and new steam-raising plant, comprising three Lancashire boilers, each 7 ft. 6 in. in diameter and 28 feet long, to work at a pressure of 160 lbs. per square inch, with Green's fuel economizer, steam superheater at the end of each boiler, and "Sirocco" fan, with "Sirocco" breeze furnace. At the Cavendish Street works there has been installed one of Pintsch's carburettors—the first in England. A new trunk main has been laid from these works, and nearly a mile of old mains taken up and replaced by others of larger diameter.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held on Friday, at the Chief Offices, Horseferry Road, S.W.—Colonel W. T. MAKINS (the Governor) in the chair.

The SECRETARY and GENERAL MANAGER (Mr. J. W. Field) having read the notice convening the meeting, the report and accounts, given in the "JOURNAL" last week, were presented.

The GOVERNOR: In moving the adoption of the report, I will offer the usual few remarks. The accounts of the past half year are not to be judged by the amount we withdraw from the undivided balance brought from the June half year; for I shall, I think, satisfy you that the amount thus withdrawn on this and on recent occasions from the accumulated surplus of preceding years has been properly and profitably spent. As regards capital, dealing shortly with the capital expenditure, I cannot do better than refer you to the figures in the Statement No. 3 of the accounts, which give you all the necessary details of how the small amount charged—namely, £38,023—has been spent. You will see that the largest item is a most satisfactory one—namely, that the sum of £16,558 out of the total expenditure of £38,023 has been devoted to the purchase of new and additional stoves. The other items in the account call for no comment. The income of the Company from the sale of gas during the past half year has improved. The percentage of increase is small, but it is satisfactory, considering the character of the Company's district, and the competition of the electric light—a competition which is fostered by what I venture to think is a most objectionable as well as dangerous system, that of municipal trading. To let you know the extent to which this system is being worked, the London County Council are now availing themselves of the services of the staff of the University Extension Society for the purpose of a course of lectures on the advantages of electricity. Admission to the meetings at which these lectures are given is free; and a large portion of the expense of them is apparently provided for out of the rates. I may say, to digress for a moment, that, in spite of this, we are getting on satisfactorily as regards the new system of public lighting. Only to-day it was reported to the Court that the borough of Hampstead had adopted the system, and also that the borough of Paddington had devoted a considerable sum of money towards an experimental installation (which I have no doubt will be successful) of the same kind of lighting; so that, in spite of the action of St. George's, Hanover Square, to which I referred at the meeting six months ago, which has deprived us of the lighting of that part of London, we are still gaining in other parts, or rather retaining our public lighting, and not being supplanted by electricity. I am glad to be able to repeat what I said on a former occasion, that many of the local authorities who have not committed themselves to the adoption of electric light are so satisfied with incandescent gas lighting when applied to street-lamps, that they have given instructions for the incandescent light to be substituted for the flat-flame burners. Boroughs where this system has been adopted are far better lighted, especially in foggy weather, than those in which the public lamps are supplied by the electric light. That this is so is now admitted by all unprejudiced persons; and the ratepayer is further benefited, since the cost of the incandescent light is 30 per cent. below that of its less efficient competitor. With regard to gas-stoves, I have only to repeat my usual remarks thereon. We have issued during the last half year some 7500 additional stoves; and the specially gratifying feature is that one-half of them have been purchased by the consumers. This matter of heating and cooking by gas is one to which we devote very special attention; and the business has been aided by the extension of our show-room accommodation, and by a system of popular lectures given throughout the Company's district. You will see that the reduction in the revenue from coke has been, in proportion, larger than the reduction in the cost of coal, and also that from our other residual products we have obtained a greatly reduced revenue. Altogether, our aggregate reduction on this account has been £156,664. There is, however, no reason to expect lower prices for coke than those now current; and there are good grounds for hoping that the revenue from tar and liquor products will be maintained. With reference to the reduction in our receipts from the sale of coke, I do not, for several reasons, propose to adopt the course recently taken by the Chairman of one of our neighbouring Gas Companies (I do not refer to the South Metropolitan), and attribute their inefficient methods of dealing with coke sales to the fall in the market prices, first because he may not be here to defend his Board, and, again, such a suggestion might be wholly without foundation. But my chief reason is this, that it would be wholly contrary to the traditions of this chair that I should attack the Chairman of another Company in his management. I have not indulged in such recriminations; and so long as I occupy the position of Governor of this Company, it will have no place in the addresses which I deliver to you from time to time. With regard to coals, turning to the debit side of the revenue account, it will be found that our coal account did not benefit to the full extent for the whole half year by the reduction in price. Our contracts, as you may remember, ran on to the 30th of June; and at that date there were arrears to come in which, with the stock on hand on the 1st of July, were sufficient to meet our requirements up to the beginning of September. The same remark applies to some extent to the item of oil. As regards both coal and oil, the figures of this half year are much more favourable, and the outlook, especially as regards oil, to which I referred last year, is most encouraging. The reduction in the item of wages gives us great satisfaction. Whereas the rate paid per ton of coal in December, 1900, was 3s. 4·27d., the rate paid last year was 3s. 0·44d., or a reduction of 3·83d.—nearly 4d. a ton. With respect to this important item, I may repeat what I said as regards the cost of coal and oil, that the figures for the current year will be even more favourable. As regards the saving in wages, it has been secured by reconstructing some of our retort-houses on the inclined principle, and by extending the system of mechanical stoking; and it

is towards meeting the cost of these and other similar improvements that a large proportion of the undivided balance which we had accumulated on June 30, 1900, has been devoted. I believe you will agree with me that such an appropriation of an undivided balance is far better business than allowing it to remain at your bankers earning no return. It may interest you to learn the approximate figures of the amount thus spent during the past three years. In 1899, we spent £30,000; in 1900, £40,000; and in 1901, £120,000—a total of £190,000 for the three years. The amount which has been withdrawn during the past three half years from our undivided balance has been £231,920. But it appears to us that we must now pause; for while it is true that by reason of the reduction in the net cost of coal the cost of gas making will be reduced, it is also true that we have more than pledged this saving by the very liberal reduction of 5d. per 1000 cubic feet in the price of gas, which came into operation on the 1st of January this year. Let me remind you that 5d. per 1000 cubic feet means for this Company an annual sum of £400 000, equal to 2½ per cent. on our ordinary stock; and this £400,000 is in one sense a loss to our revenue account. In order to meet this serious reduction, we must supplement what we shall gain from the lower cost of coal by some considerable saving under the head of reconstruction. Do not misunderstand me. I am not referring, of course, to ordinary wear and tear and maintenance, which must go on as it has gone on in the past—must go on under any circumstances; but further work of this special description beyond what is already in hand and contracted for must wait until there is again a surplus of profit available for employment on reconstructional work. Our distribution charges have been again reduced, owing to the limitation of supplies on the automatic meter system. I think we can see our way to the resumption of such supplies on a modified scale during the current year. Indeed, we have just entered into negotiations to take up some 70 blocks of workmen's dwellings, or 4000 tenements, now in course of erection by the London County Council and other public bodies. There is one other item which calls for special notice. I need hardly say I refer to rates. The valuation of London has just been increased by £2,209,000. Yet the rates in the pound in our case are higher than ever; for in the past half year we have paid 7s. 0½d. in the pound, or an increase of 3¾d. in the pound over the figures of December, 1900. Comparing these figures with those of three years ago, we find the increase to be 10d. in the pound—equal, upon the Company's total assessment, to an additional burden on our consumers of £32,000 a year, or nearly ½d. per 1000 cubic feet of gas. The net results then of the half year show an increase in our gross profit of £47,506, as compared with the profits of December, 1900. Our charges for capital show an increase of £5481. The net advantage, therefore, of December, 1901, over December, 1900, amounts to £42,025; so that while in the corresponding half year we had to dip into our undivided balance to the extent of £75,184, the amount to be taken from the balance on this occasion is only £32,159. This, however, leaves us with a balance reduced to £64,834—a fact which emphasizes what I have said about the necessity for holding our hands for this year in the matter of special reconstructural outlay. I am reminded by the Deputy-Governor that the £64,834 does not, of course, include the reserve and insurance funds. You will see from my cautious references to this year's financial arrangements, that the prospect of any increase in the rate of dividend payable in August next, to which you would be entitled in consequence of the reduction in the price of gas, is a somewhat slight one. But notwithstanding this, I consider our policy of reduction to have been thoroughly sound, although one of its effects will most probably be the withdrawal of a further sum from our undivided balance—not, I repeat, for the purpose of paying any increased dividend, but simply for making up the amount required to pay the dividend at the same rate as you are about to declare to-day. It is quite true that we have been blamed before for dissipating our accumulated funds in reducing the price of gas; but we shall not allow the attacks of uninformed critics to hinder us from doing what we consider to be our duty in the interests of our partners, the consumers. The second paragraph in the report tells you that, owing to the loyal support which the Court of Directors received at the hands of the whole body of our ordinary shareholders, numbering from 12,000 to 15,000—and it is not worth while to refer to the few and insignificant exceptions—the balance of the Company's ordinary and debenture stocks were successfully placed in August last. This operation afforded the Company at a period of exceptional difficulty the greatest relief. It has helped us to reduce our indebtedness to our bankers, which in December, 1900, was £475,000, to £100,000 in December last; and I am pleased to add that, while at this date last year we owed our bankers the large sum of £550,000, to-day we only owe them £50,000. The shareholders will, I am sure, realize that this improved condition of finances is a sincere cause for congratulation. I would add one more word, to express my regret—I do not think I will do that. I was going to express regret at some of the letters received; but I think it is just as well not to unless something may arise hereafter. It remains now for me to deal with the balance of the charges incurred, amounting to £17,610, towards which you were last year pleased to allow £7530 to be deducted from your dividends. There remains £10,080; and the Court will ask you to pass a resolution to-day, supplemental to the declaration of the dividend, authorizing the deduction of 1s. 4d. from the rate of dividend declared, which will be, I assume, £2 4s. per cent., and the distribution among the shareholders of £2 2s. 8d. per cent. for the half year, and the application of the amount deducted to the liquidation of the outstanding liability. This, if you are pleased to adopt it, will have the effect of completely cleaning the slate; and I hope and trust, and I think I may say, that such a state of things is not likely, or even possible, ever to occur again. I do not know that it is necessary for me to remind the meeting of two considerable advantages which were secured to the Company by the issue of the stock in question. The first was that it has enabled us to postpone for a time any renewal of our applications to Parliament for additional capital powers. This respite will afford us an opportunity of effecting further improvements in our works and plant, which are necessary in order to cheapen the cost of production. The second advantage was that the price of the ordinary stock steadily rose from £91 per £100 in August, to £98—a price which has been fairly maintained up till now. This rise in the market value of the ordinary stock represents an aggregate sum of upwards of £1,000,000. One gentleman foretold as the result of our operation that the price would fall to about 50. I do not think his prophecy was founded on much knowledge. The fifth paragraph of the report informs you that it has been determined to sell the site of the Pimlico works. There were several reasons for adopting this course. In the first place, the works were to a large extent out of date, and they would shortly have needed reconstruction. Had the land been wholly the Company's freehold, reconstruction might have been carried out, and with profitable results, although at considerable, if not undue cost. But only about one-half of the site is freehold; the other portion being held under several leases having, from a gas company's point of view, but a few years to run. It would therefore have been, under such conditions, economically impolitic to embark upon the large expenditure which the construction of a gas-works having a capacity of 3 million cubic feet would necessitate. Fortunately, at this moment there is a keen competition for any block of land which is well within the Metropolitan area; and especially is this the case where there is the valuable adjunct of good river wharf accommodation, which we have at Pimlico. We have thus a very valuable asset, which, under all the circumstances, it appeared to the Directors it was advisable to realize. We have also arranged to sell, at about the same time, the small gasholder station at Vauxhall, which has lately been used for the storage of gas made at Pimlico. This is the last portion of the late London Gas Company's original works at Vauxhall. I may add that the construction of manufacturing and storage plant to make good the reduction of capacity by the demolition of the Pimlico station is not likely to become yet awhile a pressing question, inasmuch as we have, at Beckton and elsewhere, a considerable margin of plant available for meeting all probable increase of business for some time to come. The money obtained by these sales will, in accordance with the provisions of the Company's Act, be available only for capital purposes. In the sixth paragraph, the Directors have dwelt at some length with the vexed question of the sale of the Nine Elms works and our district south of the Thames. We have never viewed this proposed transfer with much favour; but as it was the only one out of the five recommendations of Sir James Rankin's Committee to which we could give effect without the assistance of Parliament; we have from time to time loyally endeavoured to come to terms with the South Metropolitan Gas Company. In the autumn of 1899, the South Metropolitan Company approached us; and negotiations were entered into. After a great deal of pressure, we agreed to sell the whole of that section of our undertaking for £900,000. It was represented to the Court—and there can be no doubt it was correctly represented—that this price was wholly inadequate, and that the fair value was £1,250,000. We considered, however, that this was not altogether a question of getting the full money value of the property, but that there were questions both of policy and finance to be borne in mind—that it was worth something to get rid of the restrictions as to our price of gas for public lighting, and that it was worth something more to obtain control even of the £900,000 offered by the South Metropolitan Company. However, in 1900 Parliament, when considering the Bill of the South Metropolitan Company, which contained provisions to enable the sale to be carried into effect, in consequence of the objections of the local authorities to the proposed settlement, vetoed the whole scheme; and that being so, I think the obligation to endeavour to carry out recommendation No. 2 ceased to be binding upon this Company. However, in November, 1901, the South Metropolitan Company gave notice of a Bill for the following session of Parliament, which again contained clauses to enable them to purchase, and this Company to sell, the Nine Elms works and district upon terms to be agreed between the Companies. The question of price to be paid had not been discussed; and all we had to do was to wait and see whether Parliament would reverse its decision of the preceding session, and grant the South Metropolitan Company the powers they sought. The South Metropolitan Company, however, then inserted a wholly new provision, the effect of which would have been to continue, in the event of the transfer taking place, the most objectionable feature of the existing arrangement—namely, the regulation of this Company's charge for gas by the price charged by the South Metropolitan Company. It is true that the suggested clause imposed some limit to this regulation; but the unsound principle remained. The clause, however, was not pressed; but Mr. Livesey accepted a far more objectionable one, which imposed the condition that, before any such purchase by the South Metropolitan Company could take effect, this Company should apply to, and obtain from, Parliament power to raise additional capital. This Company's position was, however, to some extent protected by a provision in the clause which limited its operation to the current session; so that, in the event of our not promoting a Bill for additional capital this year, the whole scheme in the South Metropolitan Act for the transfer of the southern district would become inoperative. This Company approved of the limitation, because it rendered possible, at some future time, a fuller consideration of the whole question by Parliamentary Committees under more favourable circumstances. The possibility of this clause being effective, however, changed the whole aspect of the transaction. The local authorities had not said their last word as to their right to a preferential charge for public lamps; and in the event of a sale, we could not touch a penny of the proceeds until we had obtained further capital powers from Parliament, subject to such conditions as it might seem good to the Legislature to impose upon us. It was under these changed conditions that we reopened the negotiations with the South Metropolitan Company in October of last year. Two years had elapsed since the publication of Sir James Rankin's Committee's recommendations, and conditions besides the parliamentary ones had changed. We had, during these two years, spent, and we are still spending, considerable sums of money upon improvements of the Nine Elms station, which improved its position to one second only to Beckton as a cheap working station. But what was of even more importance was the fact that the quantity of gas sold in the southern district grows at a greater annual rate than in the northern district; so that what we were called upon to sell was our second largest and best station, and the district which was growing with a larger annual rate of progression than we had in our northern district. We knew, from statements made by Mr. Livesey, that he wanted the works—he wanted the district; but evidently he did

want to pay an adequate price for them. This was made apparent at the early stages of our short negotiations on the last occasion; for when, in consideration of the loss of all the advantages we had hoped to gain by the scheme, we had adjusted our price to the market value of the working district as a going concern with a future before it, the Board of the South Metropolitan Company not only refused to entertain our offer, but declined to make any counter offer. Of course, we may be in error in our estimate of the value of the thing we have to sell; and I suggest that equally, of course, they may be in error in their contention as to their estimation of the value of that which they want to buy. That being so, surely it would occur to any man of commercial experience that the difference between us was eminently a question for arbitration; and this was what your Directors at once proceeded to suggest should be the course adopted. Here again, however, Mr. Livesey bars the road. He will not, and his Board will not, go to arbitration. Well, we can do no more in the matter. I do not pretend to say I am sorry at the result; but with this record of the facts before you, you are in a position to judge whether or no the Court of this Company have done all in their power to carry out a proposal which has been made with the high sanction of a Committee of Parliament. We shall now go on, I hope, undisturbed by any revival of this barren discussion. We shall improve our business in the South—further improving the works, and promoting, as far as we can, the sale of gas; and I have no doubt it will prove to be an increasingly remunerative portion of our undertaking. I have only to add, in conclusion to this part of my address, that the South Metropolitan Company, by the Bill which they have introduced this session, are proposing to remove the time limit in the Act of last year, which, as I have explained, we considered a valuable safeguard, and thus to impose for all time upon the suggested transfer a condition which would deprive the operation of any shred of advantage to this Company. I have detained you so long that I will only say, as regards paragraph 7, that a series of tube railways, underground and street tramways, and subways are proposed. We shall not, of course, oppose, except with a view to obtaining the necessary protection of our property, any of these or other schemes which have for their object the relief or the regulation of street traffic which has been the subject of much legitimate discussion during the past few months. One thing I think even the public have appreciated lately, and that is the fact that, however greatly gas companies may have offended in obstructing such traffic, the local and government authorities—not to mention the electric light and telephone companies—are after all the chief offenders in this matter. All we want is to protect our property from damage, and so far as we can the public from danger, and to have secured to us the right, within reasonable limits, of access to our mains, in order to enable us to comply with our parliamentary obligations as to the supply of gas. In looking over my notes, I am convinced that, apart from the question of our being in possession of more ready money than it has been our good fortune to have for some time past, I have not had much to put before you on this occasion of an exhilarating character; but, in view of the uncertainty of the coal market, and the greater uncertainty of the weather, it is wholly impossible on this occasion to forecast with any safety the future of such a Company as this. A reduction in the price of coal of 1s. per ton—and we are told that coal is steadily falling in price—would mean a reduction to us in our coal bill of £100,000. On the other hand, a 1s. reduction in the price of coke would mean a loss to the revenue of £40,000. Again, a resumption of full work in the South African mines would mean a large increase in our revenue from the sale of ammoniacal liquor and tar products; and a bitterly cold and foggy spring and winter, which would probably kill more people in London than ten South African wars, would increase the profits by some £50,000. Then, again, there are the coming Coronation festivities, which will bring some grist to our mill. In fact, we have already many applications for a supply of gas for illuminations. With such uncertainty, who would venture to prophesy? Any one of you, even a writer of the Press, could guess with as much chance of being right as the most experienced gas manager. I will therefore content myself with saying that some of these potentialities will work for our good. I now beg to move the adoption of the Directors and Auditors' report, as transmitted to the proprietors on the 30th ult.

The Deputy-Governor (Mr. Howard C. Ward): I beg to second that motion.

The Governor: Has any proprietor any question to ask, or remarks to make? If not, I will put the resolution.

Mr. George Livesey: Mr. Chairman, after your lengthy remarks about the proposed purchase of the Nine Elms property by the South Metropolitan Company, perhaps I may be permitted to say a few words. Early in 1900, an agreement was come to between the two Companies—the one to buy and the other to sell for £900,000; but that agreement was knocked on the head by the action of Parliament. The House of Commons Committee passed it in the South Metropolitan Bill; but that same Committee rejected the Gaslight and Coke Company's Bill. Then, when the South Metropolitan Bill got into the Lords, the Committee struck out the proposal for the purchase of the Nine Elms works, in consequence of the opposition of the Local Authorities. Last year we tried again, seeing that you were going to Parliament also; and there was some opposition by the Local Authorities. I thought, I confess, that it would have been necessary to make some concession on your part with regard to public lighting; but they did not like the proposal that was made—a limit of the price for public lights. They wanted to have the whole pound of flesh—viz., to have the public lights in the north of London supplied at the price charged by the South Metropolitan Company in perpetuity. That, I showed, was altogether unfair. The Committee took that view; and in fact I think the result was it was conceded that if the purchase took place, you would be free to charge a fair and proper price for the public lighting in the North that you are entitled to by the Act of 1860. The House of Lords altered it somewhat, but left the matter really free. I think the result of the discussion before the two Committees of the Commons and the Lords was to show that the proviso that you should supply the public lamps in the North at the same price that you are supplying them in the South—which is considerably below the price charged to the consumer—is not a fair thing to the private consumer. It is, in fact, robbing Peter, the private consumer of gas, to pay Paul, the public consumer. I think that was made pretty clear. Then I inserted the clause limiting it to one year. The clause originally was that at any time when you might go to Parliament, we should be at liberty to purchase; and I myself said: "Limit it to one year. This has gone on long enough, and we must put an end to it. If it is not settled at the end of a year, I should be quite willing to let it go." I had then no idea we were going to Parliament this session. We have, however, inserted a clause in order to prolong the power of purchase. Whether the clause will be retained or not is at present a moot question. The facts are these: We agreed for £900,000. Last autumn, you put up your price to £1,300,000. That was an amount which the South Metropolitan Company could not consider for a moment; and, consequently, we declined it, and made no counter offer. Now as to arbitration. There are some things which cannot go to arbitration. We are not sufficiently interested in this matter to run the risk of arbitration; and, personally, I may say the burden of that would fall upon me, and I do not intend to take that burden voluntarily. I have had one arbitration with your Company. I then made a vow that I would never enter into another with you; and I intend to keep it. As to your remark about the so much larger increase in the South than in the North, I do not see that is any advantage to you when you are obliged to sell gas at our price, which is admitted is almost less than cost price. However, I think that we may consider the Nine Elms matter is at an end. I do not intend to take any more interest about it. I am afraid the Directors do not appreciate the position in which this Company is placed. You spoke of a clean slate. It is clean indeed; there is not another shot in the locker. Every penny of capital has been issued; and I do not remember a single instance of any gas company being in a similar position. Perhaps there have been similar companies; but none of the large companies have ever been in the position that every penny of capital has been called up. The position is this: You cannot make the necessary extensions to enable you to maintain your business. You have been obliged to stop the supply of slot meters, which is a large source of income. A manager of a provincial gas company told me only this week that, whereas they were selling 100 million cubic feet of gas more this year than they were three years ago, yet more than the whole of the increase has been due to the extension of the use of slot meters. If they had not had the slot meters and the stoves, they would have gone back 50 million cubic feet in the three years. Then, again, the impecuniosity of this Company in regard to capital deprives you of the opportunity of making those increases of business which are so necessary to enable you to hold your own. Then there is the other position to which you have alluded. You have said that the reduction in price means £400,000 a year. That means that, in the current half year, there will be a deficiency owing to that reduction of £200,000. Whether the £64,000 of undivided balance will be sufficient to enable you to meet the present dividend next June is a very doubtful point indeed—in fact, it seems to me that the Company, both in regard to capital and as to revenue, are in a very unsatisfactory position. Here I may be allowed again to make a suggestion—I do not suppose it will be acted upon—that the mistake is in not facing the position of Sir James Rankin's Committee. That position is that the initial price should be reduced with a concurrent increase in the scale rate of dividend. I admit that to reduce your initial price from 3s. 9d. to 3s. 3d. would be unfair to the shareholders, because it would mulct them in dividend until the actual selling price of gas is reduced to 1s. 9d., which is not a fair figure. But I am firmly convinced that if you had been willing to accept a reasonable reduction of the initial price, you would have got your Bill in 1900. Had there been a willingness on the part of the Company to accept the recommendations of Sir James Rankin's Committee as to reduction of the initial price, Parliament would have been glad to pass the Bill. I had it also from members of Parliament, when your Bill was under discussion last session, that the opposition was urged with great regret by many members; and if there had been shown a disposition to accept the recommendations of Sir James Rankin's Committee, your Bill would have passed a second reading. I do put it to you, Sir, that those recommendations, particularly that as to a reduction of initial price, will have to be accepted; and the shareholders had better make up their minds as to that. The longer you delay, the worse it will be for you. Of course, it is gone for this session. I do not know whether Parliament would listen to an appeal to allow a Bill to be brought in if you would accept those recommendations. Whether that is possible or not, I feel perfectly certain that this Company must accept the reduction. The South Metropolitan have accepted it, and the Commercial Company are promoting a Bill this session in which they propose to accept an initial reduction. I suggest that you should seriously consider the suggestion and accept the proposal of Sir James Rankin's Committee; also coupling with it the reduction of the illuminating power to at least 14 candles. I think that would materially help the Company. There is one other thing I wanted to say, and that is in reference to the Welsbach system of lighting. This, I consider, is our sheet-anchor. There is no doubt whatever that, by the aid of the Welsbach system of lighting, we can hold our own, and more than hold our own, against every other system of artificial light. But how is to be done? I do not know whether the Chartered Company have adopted the principle of supplying consumers with mantles and of maintaining them. I can only tell you that it has answered most admirably in the case of other companies. They are, for a quarterly charge, undertaking to keep the Welsbach burners in order, and to supply the mantles. In some cases, it is an inclusive charge of 9d. per quarter per burner; in other cases, it is proposed that the charge should be 3d. a quarter for the attendance and cleaning, and the consumer to pay the cost of any new mantles supplied. We began that a few months ago; and now we have about twenty men doing nothing but changing and maintaining these mantles. There is another point, and that is that the mantle business is at present in a very unsatisfactory condition. Mantles are to be bought now for about 2d. each—£9 per 1000; it is a trifle over 2d. each—mantles good in every respect. But the Welsbach Company's charge is, I think, 5d. We are in this position, that we are placed at a very great disadvantage compared with the Continent of Europe, where the patents have expired, and the Welsbach mantles are supplied at a cost of 2d. or 2½d. The consequence is that in Vienna as much as 90 per cent. of the lighting is by means of the

incandescent system. My friend Mr. Webber, who was in Germany in 1900, has made a report that 85 per cent. of the lighting was by the Welsbach system. It is to our interest, and it is our duty, to do all we can to develop this system. The Welsbach Company are pursuing a policy—I hope now the Advisory Committee have the matter in hand they will do better—of issuing writs against a number of small people. I consider this is a matter of such importance to the gas companies, that it would be the greatest misfortune if, in any action that may be tried, there should be a failure to put in a proper defence; and what I want to see is some co-operation on the part of gas companies to ensure that any action which may be tried on this 1893 patent should be defended in the most thorough and efficient manner. How it is to be done, I am not quite prepared to say; but I think a guarantee fund might be established for the purpose. If the 1893 patent should prove to be valid, we are then in the hands of the Welsbach Company, with their enormous capital of £3,500,000, for five years longer. Those five years will perhaps be the most critical period in the history of gas companies. If we have a free hand to develop the Welsbach system of lighting, I have no fear whatever; but if we have not that free hand, I look upon the ensuing five years as a very difficult period indeed for us.

The Governor said that, before putting the motion for the adoption of the report, he would briefly reply to the remarks which had been made by Mr. Livesey. He was glad to know that, with regard to the value of the Nine Elms station, they agreed to differ in the future. Mr. Livesey did not want any more bother about it; nor did they. Both sides had striven to carry out the recommendation, but had failed. With regard to the position of the Company, it was not so bad as Mr. Livesey had stated, though it was true that the whole of their capital had been called up. They were, no doubt, at one time, in a tight place; but, by the co-operation of the shareholders, they had now £300,000 in hand, and consequently were out of that tight place. Mr. Livesey said they were not in a position to carry out necessary extensions; but they had none.

Mr. Livesey: I meant extension of business.

The Governor: Quite right. As regarded provision for carbonizing and production of gas, they were in a good position—in fact, so good a position that they could afford to dispense with the Pimlico works, and yet not cripple themselves. In addition to the £500,000 which had now been liberated, they would have the proceeds of the Pimlico and other works which it was proposed to sell, which would be available for capital purposes within the next few years; so that the pressure of going to Parliament had been relieved. Of course, it was undesirable that matters should remain unsettled. When they had set their house in order, and improved the construction, as they were doing every half year by the introduction of inclined retorts and more modern machinery, they would go to Parliament and ask for such an amount of capital as was required to meet the wants of the Company. He did not wish to prophesy; but speaking entirely for himself, and not committing either the Company or his colleagues, he was inclined to think if the Bill of the Commercial Company was accepted by Parliament, and Parliament again affirmed a modification of the sliding-scale on the terms of Sir James Rankin's Committee, as well as the reduction in the illuminating power of gas from 16 to 14 candles—which he had always thought desirable—they would naturally draw their Bill on those lines. With regard to slot meters and stoves, they were doing a good business, and they would not starve it. Practically, they had set it going again; they had done very well last half year, and hoped to do better in the coming twelve months. As to Welsbach burners, he fully endorsed what Mr. Livesey had said—that it was impossible to put too high a value on the incandescent system. They did not adopt exactly the same method of dealing with this as the South Metropolitan Company did; but they did supply mantles at cost price, and attendance free to anybody who adopted the system. The experiment had been tried for a little time, and they would see whether it was desirable to adopt it. He was in accord with Mr. Livesey as to the advisability of adopting the use of these mantles; but as to the suggestion that gas companies should enter into a combination or guarantee with a view to fighting the 1893 patent, there were legal difficulties in the way which perhaps had not struck Mr. Livesey. There was such a thing as a legal regard for the rights of suitors—there was such a thing as maintenance and barratry; and they might find themselves in a rather awkward position if they helped people to fight an action with the funds of a public company. The suggestion was one with which he agreed; but the difficulty was how to carry it out. Perhaps some large gas shareholders might do it without bringing the companies into the field. However, that was a question which might await further discussion.

Colonel Munday said Mr. Livesey had stated that the Welsbach system was the sheet-anchor of their property, in which observation the Governor agreed; but he then turned round and made an attack on the Welsbach Company, and proposed that gas companies should unite in opposing them in the legitimate stand they had made against infringers. This was most uncalled for. If they desired to work in harmony with the Welsbach Company, they ought not to commence by backing up those who wished to upset the system. He was a large shareholder in the Welsbach Company, and knew that their policy had been from the first to reduce the price of mantles. When the system was first introduced, a mantle cost 2s. 6d.; but now the price was 7½d. to the public and 5d. to the trade, and there was every prospect of a further reduction. It was rubbish to say that one could get as good a mantle for 2d. as the Welsbach Company's. One point which was deserving of consideration was whether energetic steps could not be taken to get parliamentary sanction to sell gas of less illuminating power. For cooking and heating purposes, and also for incandescent lighting, a low quality of gas was just as good as a high one.

The Governor said he was glad to hear from the last speaker that he desired a closer connection between the gas companies and the Welsbach Company; but hitherto they had been met in a very different spirit. When they sought to establish better relations with the Company, and asked for a reduction in the price of mantles, they were met with the observation that they preferred ironmongers to gas companies. A change had now come over the spirit of the Welsbach Company, and it might be that they (the Gaslight and Coke Company) would be able in future to enter into closer relations with them, to their mutual benefit. If this were so, no one would be more pleased than himself. As regarded the attack on the patent of the Welsbach Company, it was a case of "Pull Devil, pull baker," as the consumer wanted as cheap a mantle as he could get. The Welsbach Company wished to exclude all mantles except those manufactured by themselves; and the interest of the gas shareholder would be to have the "open door" policy. If they could open the door, he thought it would not be a very unfair thing to lend some assistance to get it open. Of course, it would be impossible for them to finance any legal opposition in the Courts. It was true London was not on the same level as other countries with regard to incandescent lighting; for whereas in Vienna 90 per cent. of the lighting was incandescent, here it was only 15 per cent., and 85 per cent. was done by the old-fashioned flat-flame luminous burner. He should like to see the proportions reversed, because it would then be more easy for them to fall into line with other companies, and reduce their illuminating power.

The motion was then put and carried unanimously, as was also one authorizing the payment of a dividend on the ordinary shares at the statutory rate of £4 8s. per cent. per annum.

The Governor next proposed a resolution authorizing the deduction of 1s. 4d. per cent. for the half year from the dividend, to cover the balance of the expenses of the issue of £163,190 of ordinary stock in August last.

The Deputy-Governor seconded the motion.

Mr. Hughes asked what the £10,000 had been paid for. Was it commission to stockbrokers for taking the stock? because, if so, it seemed a pure waste of money. He did not agree with the Governor that the price of the stock had gone up; and he objected to artificial methods being adopted to raise the price in the market. He hoped that, if at any future time a reduction was contemplated, proper notice would be given to the shareholders, and the thing not sprung upon them as was the case at the last half-yearly meeting.

The Governor said the Company could not issue stock below par. In August the price was 91; and as it was imperative that the stock should be issued, the difference between 91 and par had to be paid to somebody to take it at par. Whether it was called "commission" or "discount," it was the making up of the market price to par value for the purpose of issuing the stock. It could not fairly be said that the matter was sprung upon the shareholders, as reference was made to it in the report, though, of course, the exact terms could not be mentioned until the requisite power had been obtained from the shareholders. There never had been any intention on the part of the Board to take advantage of the shareholders. The Directors were appointed to do the best they could for the proprietors; and they had always done so. Nothing was further from the intention of the Board than to spring a mine on the shareholders, or to take them unawares.

The motion was carried unanimously.

The retiring Directors (Sir John Aird, Bart., M.P., and Mr. John Miles) were re-elected; and Mr. Allen Stoneham and Mr. John J. Walker were re-appointed Auditors.

The Governor next moved a resolution empowering the Company to dispose of such portions of their property as were not required for the purposes of the undertaking.

The Deputy-Governor seconded the motion; and it was carried unanimously.

Mr. C. E. Jones proposed a hearty vote of thanks to the Governor and the Court of Directors; saying that at this time of their history it was more than ever necessary that the shareholders should work hand-in-hand with the Board. He was sure they had on the directorate gentlemen of experience and ability, who would bring the old ship into smooth waters again, though it might have rather a stormy passage.

Mr. Wheatley seconded the motion, which was carried unanimously.

The Governor briefly acknowledged the vote, and the proceedings terminated.

THE INCLINED INSTALLATION AT HECKMONDWIKE.

The Contractors for the installation of inclined retorts and coal and coke handling plant at the Heckmondwike Gas-Works (Messrs. R. Dempster and Sons, Limited) have prepared some information regarding the results which are being achieved there. The following is an interesting extract: "At the Heckmondwike Gas-Works, they are now carbonizing coal in this new installation at under 1s. per ton. When a fourth bed is put to work, the cost will be reduced to about 9d. per ton. This cost includes all the wages that can reasonably be put down to carbonizing—viz., for all men working in the new house and looking after the coal-elevating plant, the hot and cold coke-conveyors, boilers and exhausters, also a fair proportion of the works foreman's wages. These figures will bear careful investigation, and prove that inclined retorts, along with hot-coke conveyors, are the cheapest means of carbonizing coal in gas-works. . . . The above exceptionally low rate for carbonizing is materially secured by dispensing with all coke wheelers; the conveyor automatically removing the hot coke, as it comes from the retorts, out into the coke-yard and stacking it there." The following are the details of the carbonizing costs:—

Wages paid per Twenty-four Hours.

Coal carbonized in three beds of inclined retorts in 24 hours—38 tons.	
Two men at 6s. per twelve-hour shift.	£0 12 0
Two bottom men at 5s. 5d. per twelve-hour shift	10 10
Furnace men (and assisting others) day shift only . . .	4 0
Boiler, exhauster, and elevator men per twenty-four hours .	8 0
Proportion of foreman's wages.	2 0
Wages per twenty-four hours.	£1 16 10

In a note, it is mentioned that no additional men will be required to work an extra arch. Therefore the same wages—viz., 36s. 10d.—will carbonize one-third more coal, or (say) 50 tons, which will reduce the cost of carbonizing down to under 9d. per ton.

BRENTFORD GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday, at the Charing Cross Hotel, Mr. HOWARD CHARLES WARD in the chair.

The SECRETARY (Mr. W. Mann) read the notice convening the meeting; and the report and accounts, which were referred to in the "JOURNAL" last week, were taken as read.

The CHAIRMAN, in moving their adoption, said it was as usual his pleasing duty to congratulate the shareholders, on behalf of the Directors and officers, on what he ventured to say was a very favourable account. The report showed that the amount available for dividend was £74,049, and that there had been the satisfactory increase in the sale of gas during the past half year of 8·9 per cent. compared with the corresponding half of 1900. This, he was happy to say, had taken place despite the very unpleasant competition to which they were subjected by the municipal trading in electric lighting, at the risk of the rates, of some of the Local Authorities in their district—for instance, Ealing, Hammersmith, and Chiswick. However, as he had said, despite this, and without any exceptional weather at all, they had had an increase of nearly 9 per cent. Mr. Mann had kindly got out for him and the shareholders some information, which he knew would be of interest, regarding the increase in the business of the Company Taking the last half year and the corresponding period of 1891, he found from these figures that there had been an increase of 64 per cent. in the number of tons of coal carbonized and the equivalent of oil used in the manufacture of gas. If he took the comparison back twenty years (to 1881), he saw they had an increase of 182 per cent., which was very nearly 90 per cent. for every decennial period. This was very good indeed; and it had been achieved despite the competition of oil and electricity. The gas-rental, of course, was different, because the price of gas had not been the same at the various periods. The rental last half year was £153,000, at the price of 2s. 11d. per 1000 cubic feet. In 1881, with the price at 3s. 9d.—10d. per 1000 cubic feet more—the rental was £61,800; so that there had been an increase here, in spite of the reduction of 10d. per 1000 cubic feet, of 147 per cent. in the twenty years. Comparing this also with the rental (at the price of 3s.) in 1891, they had an increase of 69 per cent. It was true the reduction in the price of gas since 1891 had not been so great; they were charging 3s. then, and 2s. 11d. now. But it would be remembered that there had been sundry great rises in the cost of coal during that period which had prevented the reduction in the price of gas; and many companies indeed had had to make very large increases. Their own Company had been one of the two suburban concerns that had not increased the price during the great coal "famine;" and, being in a position to do without the increase, he thought it had been very wise policy on their part not to advance the price. They were enabled to do without a rise by reason of their having made forward purchases of coal. Turning to the works, he said they were in a perfectly satisfactory state. It had not been necessary to spend very much money upon them during the half year—in fact, there had been nothing very great done in the way of building new works. They had been taking their time in erecting the new retort-house at Southall; and it could now be finished very rapidly, whenever the necessity arose. Regarding the accounts, he thought the capital account was especially satisfactory. They had only added a comparatively small amount; and in a going concern like theirs, with an increase of close upon 10 per cent., they must add something to the capital. New and additional meters and stoves (which item was always very heavy) had cost £11,402; but he was happy to say that, by the system of depreciation which the Directors had adopted, they had deducted from these new and additional meters and stoves (which were the primary charge against the capital) the sum of £10,188, so that virtually this only left about £1300 to be added to the cost of new and additional meters and stoves. The result was that they had only had altogether an expenditure on capital account of £6989 during the half year. As to the revenue account, coal had cost something like 1s. a ton less than at this time last year; but there had been a large additional quantity of coal and oil used, the latter of which had been dear The increase in the item of coal and oil was about £3000; but the sale of gas had given them an addition of between £10,000 and £11,000. The rental of meters and fittings had advanced from about £9366 to £10,173; and the rental of stoves, from £2269 to £2540. The residual products had been bad; and coke everywhere had become almost a drag for the time being. The result of the half-year's trading was that they had made a profit of £42,329, as against £40,501 in the corresponding half of 1900. After meeting interest and providing £36,200 for dividend, they would have a surplus of £2038, adding which to the undivided profit—£35,811—brought forward, enabled them to carry over £37,849. He thought the shareholders would be very content with this state of things. In pursuance of the policy the Directors had established, they would deduct ½ per cent. from the £37,849, or about £3250, to add to the reserve fund.

Sir R. H. WYATT seconded the motion.

Mr. A. W. OKE observed that the Company were almost in a unique position in not having had to raise the price of gas. He believed the Chairman (who was also a Director of the Portsea Island Gas Company) had had a great deal to do with the fixing of the coal contracts; and this was the secret of their balance-sheet that day. It was refreshing to hear of the increase of 8·9 per cent. in the sale of gas, after coming from a larger meeting, where owing to various circumstances, the increase was only 2¾ per cent.

The motion was unanimously carried.

A dividend at the rate of 5 per cent. per annum on the 5 per cent. preference stock, of 12 per cent. on the consolidated stock, and of 9 per cent. on the new stock having been declared,

The CHAIRMAN proposed, and Mr. ULICK J. BURKE seconded, the re-election of the retiring Directors (Sir R. H. Wyatt and Mr. Basil T. Makins), which was agreed to.

The next resolution re-appointed the Auditors (Mr. John W. Field and Mr. Monier F. Monier-Williams).

A vote of thanks to the Chairman and Directors and officers having been passed,

The CHAIRMAN acknowledged it, and remarked that their Engineer (Mr. James Husband) was absent from the meeting through an attack of influenza. It was greatly owing to the experience and work of Mr. Husband and his predecessor, Mr. Frank Morris (now a member of the Board), that the Company were in their present prosperous condition. Investigating the progress of the concern, he (the Chairman) was happy to find that the capital per ton of coal carbonized was now at the lowest point at which it had ever been. He could recollect when it was £12 per ton; it was now £5 11s. 3d. This was very interesting; and it had an important bearing on the position of the Company.

This concluded the proceedings.

BROMLEY GAS CONSUMERS' COMPANY.

The Application to Parliament.

A Special Meeting of this Company was held last Thursday at the Bell Hotel, Bromley, to consider, and, if thought fit, to approve of, the Bill which has been deposited in Parliament for conferring upon the Company additional powers. Mr. ALEXANDER DICKSON presided.

The SECRETARY (Mr. H. W. Amos) read the notice convening the meeting.

The CHAIRMAN, before reading the Bill, made an explanatory statement regarding its leading features. He said, in the first place, the Company's capital was exhausted. Their last Act gave them authority to raise £100,000 of share capital, and £25,000 of loan capital. The whole of this had been raised, with the exception of a trifling amount of £750 of debenture stock. The capital being exhausted, the necessity for the application to Parliament was apparent. He paused here for the purpose of referring to the capital account, which showed to the credit a balance of £7712; but this was subject to the capital debit which stood on the capital suspense account in respect of the outlay for the provision of services and fittings to the houses of consumers supplied under the slot meter system. This alone amounted to about £6300, apart from a few other items of capital charges in suspense, which appeared in the stock assets item on the credit side of the balance-sheet —viz., sundry stores, &c., £11,083, and coal £1224; making the total stock item £12,307. Then, when making application for further monetary powers, the Directors thought it was the proper time to also convert the shares into ordinary stock. He explained the many advantages arising from such conversion; and, proceeding, said that, in considering the classification of the stock for the purposes of conversion, the Directors had, of course, to regard the varied rights of the two classes of existing shares. The variation was such that it was not possible for them to carry out their first idea of putting the shares into one unified stock. Investigation showed them that the simplest and most convenient mode of conversion would be to create one class of stock, which they called the "A" stock, for the £50,000 of original capital; and another for the capital issued under the subsequent Act. The effect of the conversion in the way provided by the Bill would be to preserve to every holder of shares precisely the same rights and privileges which now attached to the capital held in shares. Thus there would be created a prescribed amount of "A" stock distributable over the first-named capital. Every holder of £10 in this capital, now entitled to £1 per annum, would receive £20 of consolidated stock, which would be entitled to an equivalent standard dividend of £1 per annum. In the same way, the interests of shareholders were also preserved in the case of the other stock. Every holder of £10, entitled to a standard dividend of 14s. per annum, would receive £20 of "B" stock, entitled to an equivalent dividend of 14s. per annum. So that, it would be seen, the rights of the shareholders, *inter se*, would be preserved under the consolidated stock exactly as they existed to-day. With regard to the excess dividends, the Bill provided for the preservation of the rights of both classes of stockholders to participate in the excess dividends above the standard rates just in the same way as they did to-day. Only, of course, as the nominal amount of stock given for the present holding in the capital was increased, so the rate per cent. of the excess dividend divisible over and above the standard rate was reduced in proportion to the increase of the nominal amount of stock. Now, respecting the interests of the consumers, they were not in any way altered or varied by the Bill. The consumers would be equally entitled to the benefits attaching to them under the present Act through the application of the sliding-scale. They would take in the future, as they took at present, some 80 per cent., or about four-fifths, of the whole of the excess profits above the standard dividend; while the remaining one-fifth would be retained for division among the proprietors as now. The sliding-scale would remain unaffected by the Bill, except that the portion of the clause relating to the declaration of dividends out of excess profits would be amended to the extent he had indicated. Then the scale of voting necessarily required to be amended in view of the alteration of the capital; and, instead of the somewhat intricate method which was now applicable under the last Act, they had inserted in the Bill a simple and equitable scale of votes—viz., one for every complete £50 of the aggregate amount of stock held by any one proprietor. It would be understood in this way: When one proprietor held two stocks, they would be added together, and his votes would be determined by the number of complete £50 represented in his total holding of capital. With regard to the new capital, powers were sought to raise £150,000 by stock; and the Directors had asked for power to raise it either under the "A" or "B" stocks. It was common knowledge that money could be raised by substantial statutory companies on very much easier terms the nearer the rate at which it was issued approached the par value on the market at the time being. That the higher rates of interest did not command proportionate amounts to the lower rates, was evidenced by the prices which their own two classes of shares yielded at the present time—the lower produced a more advantageous price than the higher; and, as a general fact, the public rather shied at investments in stocks which carried the higher rates of interest, and consequently commanded a very heavy premium. It was with the view of getting rid of the heavy premium, and the opportunity of being able to obtain capital on the most advantageous terms, that the Company

asked for the power to raise the new capital in either of the two classes of stock, so that they might take the market for the time being as it offered. Power was also taken in the Bill to raise money on debenture stock to the extent of 33 per cent. of the capital, which was now the common allowance by Parliament, instead of the old 25 per cent., which was the allowance in the last Act. They would therefore have the advantage which was attached to the development of the Company during the last twenty years of being able to borrow a larger margin in proportion to the share capital. Regarding the issue of the new stock, he remarked that the days of issuing stock to the proprietors at par went more than twenty years ago, when the clauses requiring sale by auction were introduced; and the Company could only expect to follow closely the precedents in the case of those large Companies who had had parliamentary powers granted to them since that time. Following these precedents, they ask for power, on the issue of stock, to offer so much of it as might be desirable to the consumers and the employees of the Company. The Directors very much wished to attract their consumers to the proprietary body, as they believed it would be a very good means of strengthening the position of the Company in the district. The stock issued in this way might be offered at a price not exceeding 5 per cent. below the average market rate for the stock for the month previous. The stock not so sold might then be offered for sale by public auction or tender at a reserve price to be fixed by the Directors. If it was not so sold, it might be offered at the reserve price to the stockholders. If the money was not so obtained, then the process was to be repeated to the extent of offering the capital again for sale by public auction or tender at a lower reserve price; and, if not so taken, then it could be offered to the stockholders at the lower price. The process might seem a little cumbersome perhaps; but no doubt it was well devised to ensure that the stock should be placed in the open market without favour. The Chairman then read the principal clauses of the Bill, and called attention to the salient features of those of less importance—among the latter being the clause to enable the Company to apply to the Board of Trade for electric lighting powers should occasion arise.

Replying to questions, the CHAIRMAN stated that the standard price of gas was 4s. 6d., the same as it had been since 1879. He had seen an announcement that the District Council were going to oppose the Bill; and it certainly occasioned him a measure of surprise, because the Company had had no communication whatever from the Council on the subject. The Board had certainly not received any complaints from them for years, besides which great care had been exercised in drafting the Bill, so as not to interfere with the public interest.

The CHAIRMAN formally proposed, and Mr. S. J. WILDE seconded, a motion approving of the Bill; and it was unanimously carried.

The Past Half-Year's Working.

The Ordinary Half-Yearly General Meeting was then held.

The CHAIRMAN, in moving the adoption of the report and accounts, said it was very encouraging to find, notwithstanding the adverse conditions of the two years, 1900 and 1901—the great advance in the price of coal, and the increase in the price of gas, with its tendency to restrict consumption—that the make of gas last year was 25 million cubic feet more than it was in 1899 before the adverse period commenced, and that the half year to Christmas last had contributed an increase of 7 millions over the corresponding period of 1900. It would also be observed that the make of residuals had been in proportion, and that the yield of gas per ton of coal carbonized was very good. The total increase in the gas-rental was only about £52. But had there been no reduction in the price of gas, they would have had a larger increase in the rental, consequent upon the greater quantity of gas that had been sold. The reduction in price, however, just about set off the advantage they would otherwise have gained from the increased sale. The rent of meters had increased by £53, and of fittings and gas-stoves by £96. This amount would grow as the business expanded. Minor changes brought up the total increase in the rental to £208. On the other hand, the receipts from coke had dropped by £1660; from tar, by £72; from sulphate, by £37; and from fittings, by £25. Altogether on the rental side of the account, they had a decreased return of some £1587. On the expenditure side, they had a decreased cost in coal of £2689; and the total reduction in items of expenditure was £2929. But, on the other hand, there was an increase in the cost of repairs and maintenance of works amounting to £600; in salaries and wages, of £132; in repairs of services, £97; in gas-stoves, £77; and in fittings on hire, £108. Smaller items brought up the total of the increases in expenditure to £1232. Deducting this from the decreased cost, they had a net decreased expenditure of about £1700. The final result was that the balance on revenue account was £7510, which was subject to deductions for interest on debenture stock, mortgages, and money borrowed, amounting to £754—leaving £6756. The continuation of the dividends at the previous rates would require £6728, and leave about £28 in their favour on the working of the half year. He recalled to mind that the result of the working of the half year to June last was a deficiency of £765; and, deducting £28 from this, left a deficiency on the whole year of £737. Their undivided balance, after the declaration of the last dividend for 1900, stood at £2577; it would now stand at £1840—the diminution being due to the deficiency in the first half of last year. But having regard to the difficulties in the coal market, the reduction in the charge for gas, and the better prospect which they hoped was opening out before them in their future contracts for coal, he thought the result on the whole was very satisfactory.

Mr. A. E. WILLETT seconded the motion, which was unanimously carried.

On the proposition of the CHAIRMAN, seconded by Mr. A. S. GEDGE, a dividend was declared at the rate of 12 per cent. on the original 10 per cent. capital, and of 9 per cent. on the ordinary 7 per cent. capital, both subject to income-tax.

The retiring Directors (Messrs. Dickson, B. H. Latter, and H. S. Hughes) and Auditor (Mr. E. E. Price) were unanimously re-elected.

A resolution increasing the salary of the Secretary (Mr. H. W. Amos) from £500 to £525 a year was also heartily agreed to.

The usual complimentary votes to the Chairman, the Directors, the Secretary, the Engineer (Mr. W. Woodward), and staff terminated the proceedings.

PROVINCIAL GAS AND WATER COMPANIES.

We commence to-day our usual reports of the meetings of Gas and Water Companies in different parts of the kingdom.

GAS COMPANIES.

Airedale.

The Directors of the Airedale Gas Company report the profits for the year ended Dec. 31 last as amounting to £2593; the quantity of gas sold during this period being 37,606,600 cubic feet. Residual products realized £1674, as against £1565 in the previous year; while the receipts from all sources totalled £8006. The weight of coal carbonized and used was 4233 tons. The dividends recommended were at the rates of 5 and 3½ per cent. on the different stocks and shares.

Chester.

The report which was presented at the half-yearly meeting of the Chester Gas Company last Wednesday, stated that the conversion of the capital stocks had been completed, and the Directors had issued £10,168 of additional ordinary stock and £8100 of 3½ per cent. debenture stock. Of the ordinary stock, £168 was issued to make up fractions of stock arising on the conversion, and £10,000 was offered for sale by auction in October last. The debenture stock was issued to applicants at par. The extensions and improvements of the retort-house had been completed, and were available for the purpose of manufacture. The demand for gas, for cooking, heating, and illuminating, had steadily increased; and further outlay would very shortly become necessary to make provision for additional manufacturing and purifying apparatus. In order to meet these requirements, the Directors were prepared to receive further applications for the issue of 3½ per cent. debenture stock, at par, during the current half year. The Chairman (Mr. John Gamon), in moving the adoption of the report, said the revenue from the sale of gas in the past six months was £265 in excess of the corresponding half of 1900, notwithstanding that the price was reduced by 3d. per 1000 cubic feet from July 1. Residuals had not done so well, on account of the depreciation in the value of tar and sulphate of ammonia. The result of the working was that after taking £792 towards the cost of the new retort-house, and paying the dividends, they would carry forward £155. The outlay on the new retort-house had been £16,050, towards which they had paid during 1900 and 1901 £2964 out of revenue. The gas sold during the past twelve months amounted to 10,711,000 cubic feet more than in any previous year. There was a slight increase in the number of consumers; and 125 additional cookers had been supplied during the year, making the total 897. Besides these, they had sold 136 gas-fires. The prepayment meters numbered 2090, an increase of 260 during 1901; and the revenue per meter had increased by 2s. 10d.

Coatbridge.

The annual general meeting of the Coatbridge Gas Company was held last Thursday—Mr. J. Johnston in the chair. The Directors reported a sum of £3864 available for distribution. The Chairman, moving the adoption of the report, stated that the Company had had a successful half year, and that there was a considerable balance (£1618) after paying the usual dividends. The Corporation had lately introduced the incandescent system of street lighting, and the Directors had arranged to erect additional lamps on the most approved plan in prominent positions in the town. The report was adopted, and maximum dividends—at the rate of 10 per cent. per annum on the original stock, and 7 per cent. per annum on the new shares—were declared. Votes of thanks were accorded to the Directors and management.

Derby.

A most satisfactory condition of affairs was laid before the shareholders of the Derby Gas Company at the annual meeting last Thursday. The Chairman (Mr. H. Swingler, J.P.), in moving the adoption of the report and accounts, said these presented a most favourable record of steady progress. During the past year, the consumption of gas had increased by 10 million cubic feet, in spite of the competition from the Corporation electric light, which was getting very severe. Since 1894 up to the end of last year, there had been an increase in the amount of gas made to the extent of 160 million cubic feet, or 36 per cent.; but their expenditure, from one cause or another—but principally owing to the rates, which had risen from 5s. 10d. to 8s. during the past six months—was getting very alarming. Last year it totalled £76,048, as against £72,495 in the previous year, or an increase of £3553. Coal had cost £40,662, which was a decrease of £1673; but this was owing to the fact that they had bought less than before. This was very satisfactory, seeing that they had produced 10 million cubic feet more gas. Repairs, &c., showed an increase of £3978, which was the result of their decision to modernize the plant. They had been very successful indeed in this, for in spite of the heavy outlay mentioned, they were beginning to feel the benefits. Last year they installed 1300 additional penny prepayment meters, making a total of 5000; and they had also put in some shilling prepayment meters, to answer the requirements of those who did not wish to have pennyworths of gas at a time, and yet who preferred to pay in advance. They had also let out 580 additional gas cooking-stoves, fires, &c.; and with a view to increasing the use of gas as a motive power, the Directors in June last reduced the price for this purpose to 2s. 3d. per 1000 cubic feet, and permitted the hire-purchase of gas-engines to be spread over periods of three, four, and five years. The revenue account showed an increase of £2786; but this would have been larger, had not the price of gas been reduced for motive power, and also by 3d. per 1000 cubic feet in September to private consumers. For residuals, they had received £21,336, as against £23,727. The total revenue for the year was £97,278, as compared with £96,806 in the previous year; but the balance to the profit and loss account was only £21,230, against £23,081. After paying all dividends, they would have a balance of £562 to be carried to the reserve fund, which now practically amounted to £20,000. In conclusion, the Chairman explained the arrangements that had been made for the taking over of the Duffield, Allestree, and Quarndon Gas Company, which was within the statutory area of the Derby Gas Company. The report

was adopted; and dividends were declared at the rates of 10, 7, and 5 per cent. on the various classes of stock. The certificate of the Engineer and Manager (Mr. J. Ferguson Bell) stated that during the past year the first section of a De Brouwer coke-handling plant for No. 1 retort-house at the Litchurch works had been completed.

Dorchester.

In the six months ending Dec. 31, the Dorchester Gas Company had a revenue of £4415, of which £3552 was derived from sales of gas and the rental of meters. The expenditure was £3183; leaving a balance of £1232. At the half-yearly meeting to-day, the usual dividends wil be recommended. The consumption of gas increased by 1,127,000 cubic feet, or 7¼ per cent., in the six months.

Durham.

At the annual meeting of the Durham Gas Company, which was held last Tuesday, the Directors' report, recommending a dividend of 10 per cent. on the original and 7 per cent. on the additional capital, was adopted. The report stated that a drop of £538 in the half-year's gas-rentals (in consequence of the reduction of the price of gas and a fall of £935 in coke sales) accounted for the lessened receipts, and necessitated the withdrawal of £561 to enable the customary dividend to be paid.

Goring and Streatley.

The report presented at the annual meeting of the Goring and Streatley Gas and Water Company, Limited, stated that, in the period under review, the increase in the sales of gas exceeded 11 per cent.; and during the excessively dry period experienced, the well had yielded an abundant supply of excellent water. The Directors had issued a further £750 of the new 4 per cent. bonds, and had thereby been enabled to cancel the same amount of the old 5 per cent. bonds. A Provisional Order authorizing the Company to raise additional capital had been deposited with the Board of Trade; and it was hoped that this Order would be confirmed by Parliament in the present session. The profit and loss account showed a balance (after paying interest on mortgage debentures and bank overdraft) of £1078, out of which the Directors recommended the payment of a dividend of 5 per cent., less income-tax, leaving a balance of £278 to be carried forward.

Grantham.

The 55th ordinary half-yearly meeting of the Grantham Gas Company was held last Wednesday, the Chairman (Mr. J. G. Thompson) presiding. The Directors in their report recommended the payment of a dividend for the past six months at the rate of 5 per cent. per annum on the consolidated stock. The Chairman briefly reviewed the accounts and the affairs of the Company, and said they had earned their full dividend and £200 over. The next duty of the shareholders would be to reduce the price of gas. The report was adopted.

Holmfirth.

The accounts of the Holmfirth Gas Company for last year show that, under the management of Mr. Hubert Russell, 2206 tons of coal were carbonized, yielding 23,328,000 cubic feet of gas. The receipts from sales of gas and meter and stove rental amounted to £3616; while residuals realized £1181. On the other side of the revenue account, £3023 was spent in the manufacture of gas, £432 in distribution, £200 in rates and taxes, and £435 on salaries, &c. The balance of net profit to be carried to next account (subject to the past year's dividend) is £1582.

Launceston.

The Chairman of the Launceston Gas Company (Dr. Thompson) explained at the annual meeting of shareholders last week that the uncertain condition of the coal market had prevented the Board reducing the price of gas below 3s. 8d. per 1000 cubic feet; but he hoped to be able to lower it to 3s. 6d. as from July next. The accounts for the year showed a profit of £763, out of which the Directors recommended a dividend of 6s. 9d. per share.

Newport (Mon.).

At the half-yearly meeting of the Newport (Mon.) Gas Company, the Chairman (Mr. R. Laybourne) said there was an adverse balance on the profit and loss account which would have to be made up from the reserve fund. It would not therefore be possible to reduce the price of gas to the consumers this half year; but in the next six months the Directors hoped to be able to do so. The Chairman also referred to a complaint from a working men's organization, who claimed that £24,000 had been paid by the working classes of the town during the twelve months. This sum clearly included the electric light expenditure as well. The Newport Gas Company were the pioneers of coin meters; and they found that they had put the price lower than it ought to have been. During the half year, some 14½ tons of pennies had been removed from the meters; and this could not be done without extra expenditure. The wages bill was a large one, amounting to £18,000 annually; and he hoped that the working men did not think the Directors ought to economize in this direction. The report and accounts were adopted; and the maximum dividends were afterwards ordered to be paid—£1000 being withdrawn from the reserve fund for this purpose.

Poole.

The revenue of the Poole Gas Company for the half year ending Dec. 31 was £5582, of which £4085 was derived from the sale of gas and the rental of meters, and £1306 from the sale of residuals. The expenditure being £4206, the balance was £1376, against £1203 this time last year. At the meeting yesterday, the Directors were able to declare the maximum dividend.

Sleaford.

Last year, the Sleaford Gas Company had a revenue of £6689, of which £3825 was for gas sold for public and private lighting. The expenditure was £5425; leaving a balance of £1264. The amount available for distribution is £3807; and at the annual general meeting to-day, the Directors will recommend a dividend at the rate of 9 per cent. per annum, free of income-tax. There was an increase in gas consumption, notwithstanding the competition of the electric light, during the latter half of the year. The number of prepayment meters has increased to 485, and ordinary consumers' meters to 590; the total number on the Company's books being 1075.

York.

In moving the adoption of the report and accounts at the half-yearly meeting of the York United Gas Company last Thursday, the Chairman (Mr. J. R. Hill) said they would all be sorry to know that their late Manager and fellow Director, Mr. Charles Sellers, was unwell. Dealing with the affairs of the Company, he said that, when the price of gas was raised in September last, the Board expressed a very strong hope that during the current year they would be in a position to lower it again, and circumstances indicated that this prediction was well based. Referring to the conversion of the Company's shares into one uniform stock entitled to a maximum dividend of 4 per cent., the Chairman remarked that they had now got on to the more modern lines of most large gas companies. The consumption during the past year had been the largest recorded in the history of the Company; no less than 671 new customers having been secured. The use of prepayment meters was extending very satisfactorily, 402 having been fixed during the twelve months. With regard to gas cookers, fires, &c., 675 of these had been fixed by the Company's own staff during 1901, exclusive of those put up by other gas-fitters in the city. Satisfactory progress had been made with the construction of the new tank and gasholder. The balance-sheet showed a deficiency of close upon £3000; but even when this was taken from the unappropriated surplus profits, there would be a substantial background to secure them against trouble. The report having been adopted, a dividend for the half year at the rate of 4 per cent. per annum was declared. A vote of sympathy with Mr. Sellers in his illness was afterwards passed.

WATER COMPANIES.

Cambridge.

The report which was adopted at last week's meeting of the Cambridge Water Company stated that during the six months with which it dealt water had been laid on to 151 premises, the rental from which would be £155 per annum; and that the total number of buildings now supplied was 16,161 The laying of the additional main to Trumpington had been completed. A sum of £600 had been transferred from the balance of the revenue account to the contingency fund, which now amounted to £5000. Dividends were declared for the half year at the rate of 10 per cent. per annum on the consolidated stock issued under the Acts of 1853, 1855, and 1866, and at the rate of 7 per cent. per annum on the 1886 consolidated stock and the first and second calls on new shares.

Carnforth.

The annual meeting of the Carnforth Water Company was held on Wednesday last—Mr. Barton, J.P., presiding. The report of the Directors showed a net profit on revenue account of £1126, which, with the balance brought forward from last year (£12), made £1138. Out of this the Directors recommended the payment of a dividend of 7½ per cent. upon the amount of capital subscribed, amounting to £1012, placing £37 to the reserve fund (making it £900), and leaving £89 to be carried forward.

Chester.

The half-yearly meeting of the Chester Water Company was held on Thursday—Mr. F. E. Roberts presiding. The accounts showed a surplus of revenue over expenditure of £3235, which, with the balance of £7035 brought forward, made a total of £10,271. The interest on preference stock required £450; leaving £9821. The usual statutory dividends were declared. They amounted to £1890; leaving £7931 to be carried forward.

Grantham.

The ordinary half-yearly meeting of the Grantham Water-Works Company was held on Wednesday—Mr. J. G. Thompson in the chair. In their report, the Directors stated that the accounts showed a balance on the revenue account of £7818. They proposed that £1750 of this should be applied in payment of a dividend for the half year at the rate of 10 per cent. per annum, and that the balance of £6068 should be carried forward. The report was adopted.

Weardale and Shildon.

The report of the Directors of the Weardale and Shildon Water Company sets forth that the net revenue account amounts to £51,271, including £11,749 brought forward. Deducting the interim dividend paid in July and the income-tax, there remains an undivided profit of £33,943, which it is recommended should be appropriated in paying a dividend, clear of income-tax, of 16s. 3d. per share; making, with the interim dividend, an average for the year of 5⅝ per cent., absorbing £19,500. Adding the payment towards rebuilding the Durham offices, £1000, and towards the cost for auxiliary and duplicate pipes, £1500, the sum is brought up to £22,000; leaving to be carried forward an undivided profit of £11,943.

York.

The accounts presented to the shareholders at the meeting of the York Water-Works Company on the 6th inst., stated that the revenue for the six months ended Dec. 31 last was £11,695, and the expenditure £4357, leaving a balance of £7338 to be carried to profit and loss account. The Chairman (Sir J. Sykes Rymer, J.P.), in moving the adoption of the report, said that the Company's mains had been laid to Strensall village; and the construction of the new filter-beds had been satisfactorily completed. While nearly every town in Yorkshire had suffered severely from the great drought during the past summer and autumn, the Company's consumers had enjoyed an unlimited supply both day and night. The Directors proposed to call up, during the half year, the remaining £4 per share on the last issue of preference shares. This was required to repay the £3104 by which the capital account was overdrawn, and to cover the cost of the extensions. They were able to pay their usual dividend, and to carry forward a satisfactory balance; for there was an increase of £470 over the corresponding six months in the water-rents, and the ordinary expenses were about the same as before. The report was adopted.

PUBLIC LIGHTING BY INCANDESCENT GAS-BURNERS.

As our columns have frequently testified, public lighting by incandescent gas-burners is gradually but surely making headway; and the progress is of a kind which our electrical friends cannot afford to despise. We learn from Mr. K. H. Buchanan, the Manager of the Public Lighting Department of the Welsbach Company, that among the work which they have at present in hand is a contract for the East Ham District Council to fit up from 700 to 800 lanterns with No. 3 Welsbach-Kern burners. It is somewhat interesting to hear that, in this case, as in several others, the bye pass is being rejected in favour of lighting by the Simmance and Abady torch. Another interesting contract, in view of the enormous electrical system possessed by the city, is with the Manchester Corporation, for a high-pressure gas-lighting installation outside the Technical Schools. This comprises 27 lanterns, fitted with three-light clusters of the Welsbach-Kern high-pressure burners. Two of Keith's No. 3 compressors are being used in this installation, the contract for which was secured in competition. In connection with the Wolverhampton Exhibition, the Company have received an order to supply 73 lanterns, fitted with three-light clusters of self intensifying burners; each cluster giving a light of about 900 candles. Columns from the Glasgow Exhibition grounds are being brought into service for this work. There has been a very good demand for these self-intensifying lamps. In the short time they have been on the market, above 1100 have been sent out; and inquiries for them are continuing in very satisfactory measure. For the lighting of the public streets of Colombo (Ceylon), instructions have been received to supply 2000 No. 3 Kern burners; and there again it has been determined to adopt the Simmance and Abady torch. Willesden is now completely lighted by incandescent lamps. Incandescent gas lighting is also going ahead in the streets of Norwich; and since Mr. Glover has been there, orders have been received for 500 Nos. 3 and 4 Kern burners. High Street, Kensington, will also soon be illuminated on the Welsbach system. There the existing lanterns are to be adapted for the purpose, and fitted with the necessary burners. Further extensions are proceeding on the Metropolitan District Railway. After the first installation of intensive burners at Westminster Bridge Station, the gratification they gave resulted in a decision to improve the lighting of practically the whole of the system. The Welsbach Company have fitted up all the stations from the Mansion House to Hammersmith; and they have recently received an order to extend the system to Ealing and the Putney Bridge Stations, including the joint stations at Gloucester Road and South Kensington. Extensions are also to be made from Mansion House to Aldgate; and on the Metropolitan Railway, it is expected that Baker Street and Gower Street Stations will ere long be equipped with incandescent burners. All of these stations, except Westminster Bridge, are lit by No. 3 and No. 4 Kern burners. Earl's Court Station is a splendid example of what can be done in the way of improving the lighting of our railway system; and the extended application of incandescent lighting in this direction proves a continued satisfaction in it, both from the illuminating and costs points of view.

MANCHESTER CORPORATION GAS SUPPLY.

As the result of an interview between the Chairman and Deputy-Chairman of the Manchester Corporation Gas Committee with Mr. Webb (Chairman of the Stockport Gas Committee) and Mr. S. Meunier (the Engineer of the Stockport Gas-Works), the Committee have decided to dispose of the portion of their undertaking which lies in North Reddish to the Stockport Corporation on the following terms: Twenty-five years' purchase of the 10 per cent. profits derived fr m the present gas-rentals of the district, *plus* the value of the mains—the cost price of the latter, less 10 per cent. for depreciation, to be their present value. The existing rental is £441; so that the annual profit, at 10 per cent., is £44 2s., or £1102 10s. in 25 years. The cost of the mains was £530; and, with depreciation at 10 per cent., their present value is £477. The total purchase price is therefore £1579 10s.

The Committee have also requested the Chairman and Deputy-Chairman to consult the Town Clerk upon the question of the liability or otherwise of the Committee to pay a servant on his return to work, after an absence through sickness or injury, full wages, if demanded by him, for the whole of the period he has been away from his duties; and, if such liability exists, to report what course of procedure is advisable.

The Committee's proceedings were confirmed at the monthly meeting of the Council last Wednesday.

LEEDS GAS WORKERS' DISPUTE.

Some discussion took place at last Wednesday's meeting of the Leeds City Council, with regard to the dispute between the Corporation and the men employed at the gas-works. A letter was read addressed to the Lord Mayor from Mr. J. E. Smith, one of the officials of the Gas Workers' Union, appealing for the concession of a minimum of six shifts a week. The writer urged that the men had given way on a number of points, and stated that they had no desire to proceed to extreme measures. In the course of the discussion, Mr. Ratcliffe said it was difficult to see how the Gas Committee could concede anything further. It was impossible to absolutely guarantee a full six days' week; and the public would not be in sympathy with the men if they held out for anything more than that. Mr. Appleton thought the Committee had been so much harassed by Trade Union leaders that it was time they made a stand. Alderman Lowden said it was impossible to guarantee in every case six shifts a week. At the same time, he assured the gas workers that if they accepted the terms offered they would suffer very trifling inconvenience indeed. The Committee could not absolutely guarantee even three, four, or five shifts a week; but the difference between the parties had now been reduced to a mere bagatelle. He appealed to the men to give the new system a trial; and then if it seemed to them that any injustice was being done, they might take action. The Committee had offered to observe a system of six shifts, so far as was practicable; and having regard to the fact that the consumption of gas varied from 5 to 15 or 16 million cubic feet a day, this was surely all that could be reasonably expected of them. He disclaimed sympathy with a statement made in the Council, that the men should strike if they were dissatisfied. The Gas Committee's minutes were adopted.

WEST BROMWICH GAS DEPARTMENT.

The Cost of Public Lighting.

At the Meeting of the West Bromwich Town Council on Wednesday, a discussion took place on the subject of the arrangement come to between the Gas and Highway Committee in regard to the charge for the public lighting referred to last week (p. 291). Mr. Garratt pointed out that from the 1st of April next the Highway Committee would be charged the same prices for public lighting that were in existence from time to time at Birmingham. The present figure was 1s. 1d. per 1000 cubic feet, with a discount of 5 per cent. This would mean a reduction in the cost of public lighting of £700; so that for the coming year the Highway Committee would require from the Council for this purpose £1950, instead of £2650. He did not consider it was satisfactory, however, for their prices to be regulated by the fluctuating charges of Birmingham; and the Highway Committee would much prefer an alteration at the end of the year, and a reduced fixed price per lamp charged. Mr. Wilson argued that the Gas Committee would be at a very serious loss in consequence of the new arrangement, and pointed out that the cost of production of gas in West Bromwich (altogether, apart from distribution and other charges) was 1s. 1d. per 1000 cubic feet. Owing to a resolution passed by the Council in March, they must not look to the Gas Committee for any further assistance in relief of the rates beyond the £700 given to the Highway Committee; and he was afraid the change of policy that had taken place would eventually result in a considerable advance in the rates. Mr. W. Lawley failed to see why they should copy Birmingham in regard to such a matter as this, and said he did not consider the new arrangement would be so satisfactory as handing over £2000 at the end of the year in relief of the rates. Mr. Bushell explained that, by reducing the charges, they were simply putting gas consumers in the position they ought to have occupied years ago. Ultimately the arrangement was approved.

LLANDUDNO GAS AND WATER ACCOUNTS.

The annual accounts in connection with the gas and water undertakings were submitted to the members of the Llandudno District Council at their last meeting. The gas accounts showed an increase of £1544 upon the revenue of the previous year; this being mainly accounted for by the additional receipts in respect of gas and residuals. The price of gas, in consequence of the enhanced cost of coal, had been raised from 3s. to 3s. 4d. per 1000 cubic feet. The gas sold during the year was 1,500,000 cubic feet more than in the previous year. After providing for the repayment of loans, interest, and other charges, there was a deficiency of £224. There was a deficit of £55 upon the accounts of the water concern. The Great Orme water scheme cost for the year for engineer's wages, repayment of loan, and interest £383; the receipts from the water charges being £50 only. Mr. T. W. Griffith, in moving the adoption of the minutes, said he did not think the Committee could for the present reduce the price of gas; as, though the cost of coal had gone down 2s. 5d. per ton, the advance which compelled them to raise the price of gas was one of 5s. As to the water undertaking, they were just expending £8000 in laying a 15-inch main, and there was only a deficit of £50. He believed there was not a town on the coast so favourably situated as Llandudno in regard to its gas and water supplies. No meter-rents were charged, and this meant a loss of £500. The minutes were adopted.

ELECTRIC LIGHTING NOTES.

Electric Light not Wanted at Bognor.

Many of the inhabitants of Bognor being dissatisfied with th action of the Urban District Council with regard to the introductio of the electric light at the expense of the ratepayers, a poll took place on the 1st inst., in order to decide the question whether or not the Council should be empowered to raise a loan of £12,000 for the purpose of defraying the cost of the installation. The result of the voting was decidedly against the project, being as follows: For the electric light, 93; against it, 296—majority against, 203. This is an unequivocal pronouncement on the part of the ratepayers; and it should settle the question for some time.

Electric Lighting at Sleaford.

At the monthly meeting of the Sleaford Urban Council on Wednesday, the Electric Lighting Committee presented a report showing that £5452 had been expended, and that a loss of £48 had been sustained on the past four months' working. Mr. Bates, the Chairman of the Committee, in moving the adoption of the report, disputed the statements of the Gas Company as to the cost of the electric light. Mr. Harris, in seconding the motion, said he had been in London the previous week, and saw nothing there to compare with the lighting of the streets in Sleaford. The remark was received with laughter. Possibly it was "said sarkastick."

Ratepayers and Electric Light Losses.

The Kingston Municipal Society state in their annual report that in October last they addressed the Town Council on the subject of the

serious charge that was laid upon those inhabitants who did not use the electric light—representing a rate of 4d. in the pound—owing to the insufficient charge made to those who did. They pointed out that less than 400 out of a total of 6000 householders were consumers of electricity; and thus more than nine ratepayers out of every ten had been required to contribute to the cost of electric light used by the small minority. We quite agree with the Society that this is a matter for regret; but if the price of current were raised, the number of consumers might drop to vanishing point. The ratepayers would not gain by this, for interest payments, &c., would still have to be kept up. It seems that the only thing for them to do is to "grin and bear it."

Progress at Torquay.

A statement was presented to the Torquay Town Council last Tuesday as to the progress of the electric lighting undertaking. In March, 1898, when the works were commenced, there were 55 consumers. Now, it was said, there are 304, and the number is steadily increasing. The necessity for considering the question of providing a new generating station was again insisted upon. The present machinery is capable of supplying 22,000 lamps; while the the number now connected is 17,111. As complaints are being made in the neighbourhood as to the noise and smoke arising from the working of the plant, there is an additional reason for removal, though the most potent is the fact that the site is so restricted that any considerable extension is quite out of the question. As to the financial aspect of the undertaking, it was stated that during the past year the total revenue was £5321, and the gross profit £2806. After deducting £1188 for interest and redemption of loans, there remains a net profit of £1617. This has gone towards the reduction of the debit balance, which is now brought down to £842. The Electric Lighting Committee have resolved that a sum equivalent to 25 per cent. of the management expenses—or £125—shall be transferred every year from revenue to capital account, and £100 a year placed to a reserve fund.

Proposed Extensions at Plymouth.

Notwithstanding the fact that the Plymouth municipal electricity undertaking still shows a considerable balance on the wrong side, the necessity of large extensions is being urged upon the Town Council. According to a report prepared by the Electrical Engineer, the present plant has a capacity equal to the supply of 15,000 8-candle power lamps, or 25,000 lamp connections, in addition to the arc lighting and the working of the tramways. At present, there are 21,950 lamps connected or in process of being connected. In order to meet the anticipated further demand next winter, the Engineer recommends the addition of a 700-horse power steam generator of 500 kilowatts output, which would give a supply for 22,000 additional lamp connections. He also advises the Committee to obtain borrowing powers for various extensions of the cables, and for the provision of increased coal storage and an installation of coal-conveying machinery. The cost of the proposed extensions he estimates at £22,000. The capital expenditure already amounts to £117,100. Much of this is apparently unproductive; for the mains have been extended into districts where the demand is at present small, though it would seem to be extending in many (if not all) parts of the district now supplied. So far, the tramways are the best customers of the electricity works. In the last quarter, they took 116,000 units out of a total of 259,000 units sold; while of the balance, the arc lights in the streets took 49,000 units and private consumers 93,000 units.

Affairs at Bath.

A further meeting of the Bath City Council was held last Tuesday—the Mayor (Mr. E. E. Phillips) presiding—to consider the report of the Inquiry Committee, the debate on which, as mentioned in our last issue (p. 295), was adjourned the previous Friday. The first speaker was Mr. Powell, who defended the action of the old Committee in many respects, and pointed out that in most important matters they were completely at the mercy of their expert advisers. Mr. Shinn advocated the selling of the works, if they could obtain a fair price. As long as they had a deficit, they were making all the ratepayers put their hands in their pockets to keep up an undertaking in which they had no interest. Mr. Hatt justified the finding of the Inquiry Committee in several details, and criticized the manner in which the old Committee allowed extensions of cables to be made. He thought there were directions in which the business management of the concern had not been such as it might have been, independent of any question of the advice given by engineers. As to selling the undertaking, he reminded the Council that they were not altogether free in the matter, as the Board of Trade imposed upon them certain obligations, and it appeared that they might have to be content with sub-letting it. Mr. Tonkin thought they should have more definite information regarding the statements which had been made that a certain Syndicate had offered £105 for every £100 the Council had paid in connection with the works. Mr. John said the Council had sacrificed the old Electric Light Committee to temporary public clamour, and had not got anything in return. He defended the Chairman of the late Committee, who, he said, always acted in what he believed to be the public interest. Alderman Taylor moved an amendment—"That the old Committee [of which he was Chairman] be authorized to bring up a report dealing with the Inquiry Committee's statements;" feeling that some of them required further explanation. He said the offers for the undertaking were made prior to the breakdown in November last. There was, however, a general opinion that no more time should be devoted to discussing the past management, but that efforts should be concentrated upon the future conduct of the undertaking. Ultimately, the amendment was withdrawn, and the Inquiry Committee's report received.

Taxing Gas Companies to Pay for Electric Light.

When the electric light undertaking of a local authority turns out to be a financial failure, the owners find a short and simple way out of their difficulty by raising the rates to make up the deficiency. The gas company in the town being one of the largest ratepayers, they have to bear a double burden—they not only have to submit to the loss of the public lighting (though possibly this is not a matter which causes them much regret) and to the competition of the newer illuminant, but to increased taxation. This is to a certain extent the condition of things at Derby, as we gather from the speech of Mr. Swingler, the Chairman of the Derby Gas Company, at the meeting of shareholders last Thursday. He did not complain so much on the former ground as on the latter, because he has found, as others have done, that the more electric light is used the greater is the consumption of gas. His objection—and it was a perfectly justifiable one—was that the Company had to subscribe to a rival concern. In laying before the shareholders the condition of the Corporation's electric light undertaking, Mr. Swingler was careful not to give them any figures of his own. He quoted from one of the publications representing the industry—the "Electrical Times." In the issue for the 30th ult., it was pointed out that, after seven years' working, the concern at Derby has a deficit of £2870; and it will in all probability be increased during the current year. Mr. Swingler remarked that the reason assigned for this deplorable condition of things was the price of coal; and yet in the face of this the Corporation had reduced the price of electricity for motive power to 1¼d. per unit, when it cost them something like 2¾d. to generate it. (We may add that they fixed motors free of charge, at small rentals per quarter.) The Gas Company was a private concern, and consequently could not call upon the ratepayers to make up any deficit they might happen to have; but he felt he was justified—and if he were wrong he had no doubt he would be told so—in entering his protest against the proceeding. The rates in Derby had risen to a fearful extent during the past twelve months; and though a special reason was given, there was a probability of a still further rise. If the additional assessment were made throughout the town, and Derby became very highly rated, it would, in his opinion, stop the development of the place, because people could not afford to live there.

The Cost of Gas and Electric Light.

Complaints reach us from time to time of the misleading statements made by electricians in regard to the cost of the electric light in large engineering works. The following instance has just come to hand: The manager of a large firm asserted that their electric arc lamps cost only ¾d. per hour—this estimate having been given to him by the electrician of the establishment. He estimated that the actual cost of the current consisted of 1 lb. of coal and 1-7th of a penny for carbons per lamp per hour, and maintained that this was the total cost of the production of the electric light. No allowance was made for labour or for money invested in plant, for wear and tear of machinery, for repairs to lamps, breakage of globes, and other items which any practical man would naturally put down as properly belonging to the cost of production. The electrician did not even charge up any part of his salary. The argument used for maintaining this position is that in many of these works large electrical installations are necessary for power purposes, and that the additional cost of supplying a few hundred arc lamps is nothing more than the extra expenditure of coal and carbon for the lamps! It is not long since, in a report made by one of the experts of the London Boroughs, showing the economy of the electric arc as compared with gas and oil lighting for streets, the same line of argument was taken, and the cost of the current, *plus* the carbons, was the only item put down as the total cost of production of the light. Nothing was allowed for interest on the investment or for labour, depreciation, repairs, &c. It was stated that this report had been written by a member who claimed to be an "electrician."

At the recent annual meeting of the Prescot Reform Club, the Secretary (Mr. G. Brown), in the course of his report, referred to the alteration made in the system of lighting. He remarked that, in consequence of the exorbitant charges, the Committee had found it necessary to make a change. They had gas installed, and found the charges were somewhat about one-half those made for the electric light. This was a step in the right direction, as formerly they were paying about £34 per annum; and according to the rate of charges, they assumed the cost of gas would be £15 per annum, which was a great consideration at the present time. The President (Mr. J. Blaiklock) also referred to the new lighting; remarking that the club was more comfortable and had a brighter appearance now, owing to the better light, than it had ever had. We may add that 368-candle glow lamps have been replaced by 17 No. 2 Kern and 8 "C" burners; and although electricity is sold at 5d. per unit for the first 6 units per 8-candle power lamp, and 3d. per unit beyond, it cannot compete with gas at 3s. 10d. per 1000 cubic feet, less 10 per cent. discount, either for brilliancy or cost.

Electric Lighting at Bristol.

A striking example of the truth of the aphorism that "one story is good until another is told" has lately been furnished by Bristol. Speaking at a meeting of the St. Philip's South Ward Liberal Association on "Progressive Bristol," Mr. Elkins referred to the electric light undertaking. He stated that their first works were constructed for 20,000 lamps, and last year the increase amounted to 27,000 lamps—7000 more than the whole number their first installation was designed to serve. They had erected fine new works on a site large enough to last them for the next fifty years, and had there two dynamos each equal to 30,000 lamps. At the recent rate of progress, a couple of years hence another enlargement would be needed; so that almost as soon as they opened the new works they would have to begin a further extension. The Committee were to be congratulated that they had thus developed this great enterprise—spending enormous sums of money, without any assistance from the rates. They had been able to repay the various instalments of capital, the interest on the money borrowed, and the working expenses, out of the profits, and had shown that a Town Council, at all events sometimes, could carry on a business undertaking. The last two sentences would no doubt have passed unquestioned had they not caught the eye of a vigilant ratepayer, who, through the medium of a local paper, asked Mr. Elkins if he would kindly explain how he reconciled them with the published accounts of the Electricity Department, in which it was set forth that £14,000 was taken from the rates from 1893 to 1895, and that the loss up to the end of 1901, after allowing net profits, amounted to upwards of £4000.

Mr. Elkins complied with his opponent's request—after a fashion. He explained that his statement was that the Corporation were "paying interest, repayment of capital, and providing reserve without making any demand on the rates." He said he did not expect anyone

would suppose this was being done during the construction of the original works, before light was being supplied, and under the conditions laid down by the Local Government Board for repayment of capital. Against the amount then contributed, however (£14,000), there had been repaid the capital of £37,000, and, in addition, they had met out of reserve the cost of unproductive capital employed in the construction of the new works, notwithstanding the great increase in the cost of coal. "Ratepayer" was not satisfied with the explanation; and so he followed up the subject by pointing out that the total loss on the working of the undertaking up to March last was £4213, in addition to £13,904 taken from the rates, not one penny of which had been repaid; and yet Mr. Elkins made out that the Corporation had fulfilled their obligations without making any demand on the rates! Now he said he did not expect anyone would suppose this was being done during the construction of the original works, before light was being supplied. "What," said "Ratepayer," "are the facts? From 1882 to 1893 £2450 was taken from the rates to meet, apparently, preliminary expenses. In 1893, an income from lighting of £1598 13s. 2d. was received, and £2663 taken from the rates. In 1894, the income from lighting was £6624 4s. 10d.; there was taken from the rates £4238 18s. 8d. In 1895, the income from lighting was £9988 2s. 9d.; there was taken from the rates £4557 11s. 9d. Does Mr. Elkins still say that the money was taken from the rates before light was being supplied? Again, he says: 'We have met out of reserve the cost of unproductive capital,' whatever that may mean. It is true that a reserve fund of £5000 has been formed—whether out of the profits, out of the loss, or out of the rates, I know not; but I should like to know how any expense has been met out of reserve, when nothing has been taken from the fund? £664 1s. 11d. has been withdrawn from depreciation account; but that is not the reserve fund." Mr. Elkins has not replied to this letter, considering, possibly, that silence is better than speech.

Allocation of Profits at Liverpool.

At the meeting of the Liverpool City Council last Wednesday, an interesting discussion took place with regard to the proposal that £7583 of the surplus profits of the Electric Power and Lighting Committee should be allocated for the purpose of the general rate (*ante*, p. 224). The adoption of this course having been proposed and seconded, Mr. Utley moved as an amendment that the recommendation be referred back. Glasgow, he said, had devoted £33,000, or 7½ per cent., of their electric revenue to renewal and reserve funds; while, on the other hand, Liverpool had set aside only £15,000. Considering the enormous depreciation of electrical machinery, and the possibility that four or five years hence their engines might have become obsolete, £15,000 to the reserve and renewal funds was not sufficient; nor did it place the concern upon a proper business basis. Mr. T. Roberts, in seconding the amendment, contended that they should not starve the electric lighting enterprise, even for the benefit of the ratepayers. Consumers should be considered before large ratepayers. They were the people who assisted to make the profit; and yet when there was a little profit, the Council wanted to benefit the large ratepayers. The £7500 represented ¾d. in the pound, which would be a good thing in reduction of rates for some members of the Council. Mr. R. Dart (Chairman of the Electric Power and Lighting Committee) said that last year private consumers of electric lighting increased by 24½ per cent. without any reduction of price; but consumers of power had increased by 69 per cent. The Corporation had raised their consumption for lighting by 22½ per cent., and for power by 360 per cent. The Committee's gross income for last year amounted to £168,500; and the total expenditure, to £85,000—leaving £83,000, out of which they paid £37,000 for interest. There thus remained a net profit earned of £48,000, which, on the capital outlay of £1,200,000, represented 4 per cent. Taking everything into consideration, the Committee needed this 4 per cent. for depreciation. The sum of £24,400 must be set aside for sinking fund; and this left £24,086, all of which the Council could appropriate in reduction of the rates, if they liked. It would mean a reduction of 2d. in the pound; but it would be an unwise procedure. When the Corporation purchased the electrical undertaking, they paid £150,000 for goodwill. Against this, there had been put to sinking fund and interest only £80,000; but the present year's contribution brought the amount up to £128,000, or £21,600 short of the amount paid for goodwill. Excluding the amount standing to the credit of goodwill, therefore, the electric supply undertaking was not solvent. Besides, the Committee that day were going to ask the Council to sanction a reduction in the price of electricity for lighting by ¼d. per unit, which would make the price 3¾d. per unit, or equivalent to 3s. 1½d. per 1000 cubic feet of gas. It was most imprudent to take this £7500 in reduction of the rates. The money ought to be put to reserve and renewal funds, especially considering the great risks the Committee were under regarding depreciation of mains and electrical engines, and also the possibility of the engines becoming obsolete. Sir William Forwood could not at all agree with the speech delivered by Mr. Dart. A more inconsistent speech, he said, he had seldom heard in the Council. Having told them that the Committee were insolvent, excepting for goodwill, Mr. Dart proceeded to propose a reduction in the price of electric power. Surely if they were insolvent, the proper step would be to increase the price rather than reduce it. The percentage of private consumers of electricity had largely increased; and therefore Mr. Dart could have no argument based upon the present price, which was no hindrance. Answering another argument of Mr. Dart, Sir William pointed out that the Electric Power and Lighting Committees were using the capital and staff of the ratepayers; and he maintained that, after giving the consumers light at reasonable cost, any benefit derived from the undertaking should go to the ratepayers. After all, electricity was the light of the wealthy; it was a luxury, and must ever remain such. With regard to the amount to be set aside for upkeep, he said that depreciation was a very elastic term; and the deterioration of underground works and machinery ought not to be nearly so great as Mr. Dart had foreshadowed. If they took proper advantage of the amount available for the rates, they would be establishing a principle which they might perhaps not have the opportunity of doing again. Mr. M'Neight suggested that the Electric Lighting Committee and the Tramways Committee should seriously consider the desirability of appointing a Special Committee to go thoroughly into these questions, and decide for the future the basis on which the Corporation accounts should be prepared. Having satisfied themselves that the depreciation was properly charged, then the ratepayers, he thought, were entitled to what could be made out of the concern. Mr. Utley's figures regarding the amount of depreciation were, to say the least of it, most extravagant. Mr. M'Guffie remarked that, far better than applying the £7500 to the relief of the rates, would be to offer it as a premium for the best system of harnessing the vast tidal power running past them at the pierhead. Alderman Smith ridiculed this suggestion, which, he said, was absurd. The electric undertaking had been bought on the credit of the ratepayers. The consumers had had many concessions, including a reduction of the price from 7½d. per unit to half that figure in six years. It was now time that the ratepayers derived some benefit from their own business, especially as municipal enterprise had enormously appreciated the goodwill of the electrical undertaking. The recommendation was adopted; only two voting against it.

LONDON COUNTY COUNCIL AND THE WATER QUESTION.

Objections to the Government Bill.

At the Meeting of the London County Council to-day, the Water Committee will present a long report on the subject of the Government Water Bill. After some introductory remarks, the Committee deal at length with the financial provisions of the measure and the constitution of the proposed Water Board. With regard to the former matter, the provisions in the Bill are compared with those contained in that of the Council, and the Committee say:

> The Council's clause directs the arbitrators to award such a sum of money as represents the fair and reasonable value of the undertakings. The intention of the Council was to pay the amount of this award in cash, or, with the consent of the shareholders, in stock of equivalent capital value. This proposal was approved by the Royal Commission on Metropolitan Water Supply, who reported: "The price of purchase should be payable in cash at the option of either the vendors or the purchasers; by agreement the vendors may be paid in stock of the Board." The object of the Council was to secure to the ratepayers the full value for the money paid, and also the advantages arising from the superior credit of the Council. No such direction to ascertain the just and reasonable value is given to the arbitrators in the Government Bill. They may award such amount of stock as "they in their absolute discretion think most just and fit." The Parliamentary Agent advises that this is a new phrase of great latitude and uncertainty.

In several other respects the Committee criticize the Goverment measure in its financial aspects, and point out in particular that it is possible under the Bill, that the amount of stock to be given to the Companies may not be settled by arbitration, but by agreement between them and the Board. The Committee regard this as involving grave risk to the ratepayers, for this reason: In the first place, the new body, owing to the method of selection, will not be responsible to them; in the second, it cannot possess the knowledge to deal with the many complicated considerations necessary to determine the true value of the undertakings.

On the subject of the constitution of the Water Board, the Committee raise the following objections: (1) It will involve a new establishment and unnecessary expense. (2) A mere mockery of representation is given to each outside area, while the vastly preponderating interest of London is denied the benefits of effective public control. "We fail to see," the Committee state, "what advantages can be alleged for this scheme which can in any degree compensate for the obvious disadvantages of creating a body so heterogeneous, unwieldy, unworkable, and costly." (3) Responsibility will be so diluted as to be practically destroyed. (4) The Board will contain members having no interest, and many will be but slightly interested. It will be without cohesion, and consequently the Committee urge that the "real management is bound to fall into the hands of officials and of the paid Chairman and Vice-Chairman."

With regard to the share of the Council in the various attempts made to settle the water question, the Committee say:

> It is entirely due to the prolonged efforts of the London County Council that the water question has been brought so near a settlement. We have shown how, in matters of the highest importance, the Council's proposals have been justified upon examination by the Royal Commission and by the Government itself; and there could hardly be a stronger proof of the capacity of the Council to deal with acquisition and management in the interests of the ratepayers. What the London County Council has fought for, and what the London consumers desire, is real and effective control by a representative body responsible to them. This, we are convinced, would not be provided by the Water Board proposed, the constitution of which cannot be justified upon any accepted principle of local government or financial responsibility.

The Committee recommend the passing of the following resolutions:

1.—That the interests of the people of London in the acquisition and administration of the water supply are so vital that they ought not to be entrusted to a Water Board nominated by 78 different authorities, and independent of public control.
2.—That it is inexpedient and dangerous that a Board constituted as proposed should have the power to decide by agreement what sum shall be paid to the Companies, or that it should have the right of creating debt or of levying rates upon London.
3.—That the Council should endeavour to obtain such amendment of the financial provisions of the London Water Bill, 1902, as shall make it clear that the award of the arbitration tribunal is to represent the fair and reasonable value of the undertaking, and is to be determined as a sum of money.
4.—That the Parliamentary Committee be instructed to prepare and present a petition against the Bill, and that the seal of the Council be affixed to such petition.

Gas in Mexico.—A concession has been granted for the establishment of gas-making plant at Monterey. The Loomis-Pettibone Company, of New York, will build the plant; and it is stated that about £100,000 will be invested in the enterprise. It is proposed to supply gas both for illumination and for fuel.

DEVONPORT CORPORATION AND THE WATER-WORKS.

A Meeting of the shareholders of the Devonport Water Company was held on Thursday, Jan. 30—Mr. Cecil E. Bewes presiding—for the purpose of authorizing the promotion of the Bill by which the Company are seeking to extend their capital, and obtain powers for the construction of a storage reservoir on Dartmoor, and other works. The meeting was private; but it was stated afterwards that the necessary resolution was carried unanimously.

The Corporation, who are promoting a Bill of their own for the purchase of the undertaking, have also had the subject under consideration. On Wednesday, the 29th ult., the members, accompanied by Mr James Diggle, the engineering expert whom they had consulted in connection with the matter, paid a visit to the site of the proposed reservoir. This is situated in the Cowsic Valley, on the stream from which the supply is now drawn by means of a leat. The reservoir will be about a mile in length, and will have a total capacity of about 800 million gallons, as compared with the 650 million gallons of the Burrator reservoir of the Plymouth Corporation. The top water level is to be 1370 feet above sea level; while that of the Burrator reservoir is 502 feet. In order to relieve the pressure in the mains, a service tank is to be constructed about midway between the reservoir and the present service reservoir at Roborough. The situation of the storage reservoir is identical with that selected by Mr. Diggle when the Corporation were proposing, in 1897, to purchase the water-works; and the members of the Corporation agreed that it is admirably suited for the purpose. Both geologically and geographically, Mr. Diggle considers it one of the best in England. The course of the pipe-line which is to be substituted for the leat, and the other works contemplated, were also explained.

With the advantage of the knowledge gained from this visit, the members of the Corporation met the next day to consider the question of opposing the Company's Bill and promoting one for the purchase of the undertaking. The Mayor (Mr. E. M. Leest) presided. At the outset, a resolution was received from the Ratepayers' Association of the St. Budeaux and Pennycross districts—recently added to the borough of Devonport, but deriving their water supply from Plymouth—threatening to oppose the Corporation Bill unless they were assured that the purchase of the water-works would not add to their rates. Several representatives of these wards spoke in support of this view of the case. The Mayor pointed out that there was another side to the question. If these districts were protected from any deficiency, would they also like to be excluded from all profits that might be made? Mr. C. Organ replied that all they wanted was what was fair. If they were to continue to pay Plymouth for water, they ought not to have to pay Devonport as well. The Town Clerk admitted that the claim was deserving of reasonable consideration. He looked forward to the ultimate development of the water supply of Plymouth, Devonport, and the surrounding neighbourhood on one footing, and with an equal rate throughout the whole area. Until they were supplied by the same authority as the rest of Devonport, it seemed only equitable that the St. Budeaux and Pennycross wards, if they were not to share the deficiencies, should not take any portion of the profits. On this understanding, there would be little difficulty in arranging the details. Alderman Brooming agreed that the outer districts had no right to share in any profits that might be derived from the water undertaking before the end of sixty years, for which the money would be borrowed. Personally, he did not think there would be any profit for anybody before the expiration of this period. The Town Clerk then explained the provisions of the Company's Bill. He said that, owing to the situation of the valley, only a short embankment would be required for the construction of the proposed reservoir; and, so far as could be seen, the site was a peculiarly favourable one. It was also proposed to pipe the remainder of the distance between the town and the intake. The Company sought to raise additional share capital to the amount of £400,000, with a cumulative dividend of 5 per cent., and also to raise on mortgage an amount equal to one-third of the additional share capital. The effect of this would be to add to the present share capital of about £200,000 a further sum of £533,000. There was no provision in the Bill enabling the Company to increase their water charges; but with regard to ordinary domestic supplies, they already had wider powers than many places possessed, while for supplies for trade uses, for gardens, and other purposes, they claimed an almost unlimited jurisdiction as to the amount they might charge. If they assented to the Company acquiring powers to spend £530,000, they might find themselves in a very unfavourable position in a few years, if the Company should propose to increase their charges. Mr. H. Banbury remarked that the Company would have to go to Parliament for power to increase their charges; and the Corporation would have a better prospect of success in opposing them then than now. The Town Clerk thought the opposite was the case. Alderman J. May considered it only reasonable to suppose that the Company would increase their charges. If they raised £530,000 more capital, it must be at the consumers' expense.

Alderman J. Rolston said that the Company were going to Parliament because there was a scarcity of water at times, and they had found Plymouth a weak reed to lean upon. They said they were not going to ask for an increase of charges; and the Council were bound to believe them. The Town Clerk next explained the provisions of the Bill under which the Corporation seek to compulsorily acquire the undertaking. Alderman Rolston pointed out that by this measure the Corporation were making no attempt to improve the water-works, which was really the important consideration. The Mayor proposed, and Mr. Hornbrook seconded, a resolution authorizing the promotion of the Corporation Bill. Mr. Rendle opposed the resolution, and said that, while the water supply of Devonport had been the envy of the whole neighbourhood, the purchase of the undertaking by the Corporation would add 1s. to the rates. After some further discussion, the resolution was put to the vote, when 34 members voted for it, and 5 against, while 4 were neutral. It was then decided, with three dissentients, to oppose the Company's Bill.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 339.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 11	10½	Alliance & Dublin 10 p.c.	18—19	..	5 10 6
100,000	10	,,	7½	Do. 7 p.c.	13—14	..	5 7 2
300,000	100	Jan. 2	5	Australian 5 p.c. Deb..	93—100	..	4 19 0
200,000	5	Nov. 13	6½	Bombay, Ltd. . . .	6½—6¾	..	4 16 4
40,000	5	,,	6½	Do. New, £4 paid	4¾—4¾	..	5 9 5
380,000	Stk.	Aug. 15	12	Brentford Consolidated	265—270	..	4 8 11
270,000	,,	,,	9	Do. New . . .	192—197	..	4 11 5
50,000	,,	,,	5	Do. 5 p.c. Pref. .	130—135	..	3 14 1
206,250	,,	Dec. 13	4	Do. 4 p.c. Deb. .	112—115	..	3 9 7
220,000	Stk.	Sept. 12	10	Brighton & Hove Orig.	210—215	..	4 13 0
246,320	,,	,,	7	Do. A. Ord. Stk. .	150—155	..	4 10 4
420,000	20	Sept. 27	10	British.	41—42	..	4 15 3
50,000	10	Aug. 15	12	Bromley, Ord. 10 p.c. .	24—26	..	4 12 4
82,850	10	,,	9	Do. 7 p.c. . . .	19—21	..	4 5 8
500,000	10	Oct. 11	6	Buenos Ayres (New) Ltd.	9½—10	..	6 0 0
220,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	94—97	..	4 2 6
150,000	20	July 17	8½	Cagliari, Ltd. . . .	22—24	..	6 17 6
100,000	10	Sept. 27	10	Cape Town & Dis., Ltd.	15—16	..	6 5 0
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	53—54	..	5 11 1
550,000	Stk.	Oct. 11	12	Commercial Old Stock	265—270	..	4 8 11
236,425	,,	,,	9	Do. New do. .	203—208	..	4 6 7
238,237	,,	Dec. 13	4½	Do. 4½ p.c. Deb.	130—135	..	3 6 8
800,000	Stk.	,,	9	Continental Union, Ltd.	162—167	..	5 7 9
200,000	,,	,,	7	Do. 7 p.c. Pref.	160—165	..	4 4 10
575,000	Stk.	Aug. 29	5	Crystal Palace Ord. 5 p.c.	122—127	..	3 18 9
60,000	,,	,,	5	Do. 5 p.c. Pref.	123—128	..	3 18 2
486,090	10	Jan. 30	10½	European, Ltd. . . .	18½—19½*	..	5 7 8
354,060	10	,,	10½	Do. £7 10s. paid	13½—14½*	..	5 8 8
15,213,200	Stk.	Aug. 15	4⅛	Gas- 4 p.c. Ord. . .	97—99	..	4 8 10
2,600,000	,,	,,	3½	light 3½ p.c. max. .	91—93	..	3 15 3
3,799,735	,,	,,	4	and 4 p.c. Con. Pref.	111—114	..	3 10 2
4,193,975	,,	Dec. 13	3	Coke 3 p.c. Con. Deb.	92—94	+1	3 3 10
70,000	10	Nov. 13	8	Hongkong & China, Ltd.	13—14	..	5 14 4
3,800,000	Stk.	Nov. 13	10	Imperial Continental .	213—216	..	4 12 7
473,600	Stk.	Aug. 15	3½	Do. 3½ p.c. Deb. Red.	100—102	..	3 8 8
561,000	Stk.	Aug. 29	10	Liverpool United A .	232—234	..	4 5 6
718,100	,,	,,	7	Do. do. B .	171—173	..	4 0 11
306,083	,,	Dec. 30	4	Do. do. Deb. Stk.	118—120	..	3 6 8
75,000	5	Dec. 13	4	Malta & Medn., Ltd. .	4½—5	..	4 0 0
560,000	100	Oct. 1	5	Met. of 5 p.c. Deb.	106—110	..	4 10 11
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	102—104	..	4 6 7
541,920	20	Nov. 13	3½	Monte Video, Ltd. . .	9—10	..	7 0 0
1,515,832	Stk.	Aug. 9	4⅓	Newc'tle & G'tesh'd Con.	105—107	..	4 1 9
312,855	ck.	Dec. 27	3½	Do. 3½ p.c. Deb.	98—100	..	3 10 0
150,000	5	Nov. 28	8	Oriental, Ltd. . . .	7½—8	..	5 0 0
135,000	4½	,,	8	Do.	6¾—7½	..	4 19 4
15,000	1	,,	8	Do.	1¼—1⅝	..	4 11 5
60,000	5	Sept. 27	7	Ottoman, Ltd. . . .	5⅞—6⅛	..	5 12 0
851,070	10	Oct. 11	7	River Plate Ord. . .	10—10½	..	6 13 4
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb..	95—98	..	4 1 8
250,000	10	Sept. 27	8	San Paulo, Ltd.. . .	11—12	..	6 13 4
135,000	Stk.	Sept. 12	10	Sheffield A	244—246	..	4 1 4
209,984	,,	,,	10	Do. B	243—245	..	4 1 8
523,498	,,	,,	10	Do. C	242—244	..	4 2 0
5,850,000	Stk.	Aug. 15	5	South Met., 4 p.c. Ord.	126—128	−2	3 18 2
1,627,965	,,	Jan. 16	3	Do. 3 p.c. Deb. . .	52—94	..	3 3 10
380,940	Stk.	Nov. 13	5	Southampton Ord. . .	104—108	..	4 12 7
70,825	,,	Jan. 16	4	Do. 4 p.c. Deb.	100—103	..	3 17 8
120,000	Stk.	Aug. 29	5½	Tottenham and Edmonton A. 5 p.c. B. 3½ p.c.	122—127	..	4 6 8
250,520	,,	,,	4		95—100	..	4 0 0
182,380	10	Jan. 16	5	Tuscan, Ltd. . . .	7—8	..	6 5 0
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	95—98	..	5 2 0
230,000	5	Aug. 15	9	West Ham, 10 p.c. . .	9½—10½	..	4 5 9
172,000	10	,,	6	Do. 7 p.c. . .	12½—13½	..	4 8 11
140,900	Stk.	Dec. 30	4	Do. 4 p.c. Deb	105—110	..	3 12 9
				WATER COMPANIES.			
780,599	Stk.	Dec. 30	11½	Chelsea, Ord. . .	325—335	+10½	3 8 8
150,000	,,	,,	5	Do. 5 p.c. Pref. .	155—160	+3	3 2 6
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	140—145	..	3 2 1
175,785	,,	Sept. 27	4½	Do. 4½ p.c. Deb. .	142—147	..	3 1 3
1,720,560	Stk.	Oct. 11	7	East London, Ord.. .	205—210	+8	3 6 8
654,740	,,	Dec. 13	4½	Do. 4½ p.c. Deb. .	143—148	..	3 0 10
1,018,046	,,	,,	3	Do. 3 p.c. Deb. .	97—99	+1	3 0 7
700,000	50	Dec. 13	8	Grand Junction 10 p.c. max.. 4 p.c. Deb..	117—122	+4	3 5 7
310,000	Stk.	Sept. 27	4		127—132	..	3 0 7
708,000	Stk.	Aug. 15	16†	Kent	305—315	+7½	5 1 7
160,000	,,	,,	7	Do. New, 7 p.c. max..	205—215	+7½	3 5 1
1,043,800	100	Dec. 30	10½	Lambeth, 10 p.c. max..	310—315	+7½	3 6 8
406,200	100	,,	8	Do. 7½ p.c. max..	220—230	+5½	3 9 7
350,000	Stk.	Sept. 27	4	Do. 4 p.c. Deb..	125—130	..	3 1 7
500,000	100	Aug. 15	12⅛	New River, New Shares	400—410	+5	3 2 5
1,000,000	Stk.	Jan. 30	4	Do. 4 p.c. Deb..	127—130*	+1	3 1 7
902,300	Stk.	Dec. 13	7	South-wark and Vauxhall 10 p.c. max. 7½ p.c. max. 5 p.c. Pref. . 4 p.c. A Deb.	190—200	+7½	3 10 0
126,500	100	,,	7		206—211	+6	3 6 4
489,200	Stk.	,,	5		155—160	+2	3 2 6
1,019,585	,,	Oct. 11	4		125—130	..	3 1 7
1,155,066	Stk.	Dec. 13	10	West Middlesex. . . .	305—315	+5	3 3 6
200,000	,,	,,	4½	Do. 4½ p.c. Deb. .	140—145	..	3 2 1
200,000	,,	Sept 12	3	Do. 3 p.c. Deb. .	96—98	..	3 1 3

* Ex. div.

† Next dividend will be at this rate.

THE EARLY DAYS OF THE THIRLMERE SCHEME.

An Example of Unearned Increment.

One of the most remarkable cases of unearned increment is recalled by the recent death in London, at the advanced age of eighty-one, of the Countess Ossalinsky. She was the daughter of an Armboth yeoman, and married a Polish count. Her grandfather bought out the rights of the Lord of the Manor in the Thirlmere Valley, and turned about 714 acres into a freehold possession. The Countess's estate altogether consisted of five farms, comprising 850 acres, the land on Armboth Fells, and a number of sheep and cattle; and it brought an annual rental of £500. When the Manchester Corporation decided to bring water from Thirlmere, it was estimated that from £20,000 to £25,000 would have to be paid for this estate. The lowest valuation made on behalf of the Countess, however, was £72,000, while the highest was more than £100,000. It being impossible to come to terms, an arbitration was held, with Mr. Huskinson as Arbitrator. As Sir John Harwood afterwards expressed it, the Corporation were prepared for a heavy award to the Countess; "but every member of the Committee held his breath when the astounding award was announced of £64,447, and £6000 for the lake, or, in round numbers, £70,000, exclusive of the value of the sheep, which the Corporation had also to buy." This amount, invested in Manchester Corporation consolidated 4 per cent. stock at 111½, would have produced £2511 per annum, or put into Consols (3 per cent.) at 102½, would have yielded £2047 10s. per annum. On the receipt of the award, the Corporation took steps in the Queen's Bench Division to set it aside. A compromise was effected, and the action eventually abandoned. The question of appointing Umpires in cases of this character, however, became such an important one, that the Association of Municipal Corporations agitated for an alteration of the law. They memorialized Mr. Chamberlain, who was then President of the Board of Trade; and in a short time a Bill was passed, with little opposition, to sanction their proposal.

HONITON WATER SUPPLY.

After discussing and considering the question of the improvement of the water supply for three years, the Honiton Town Council have apparently to take up the subject again from the beginning. In November last, a Local Government Board Inspector held an inquiry respecting a scheme which had been selected out of eleven plans submitted in a premium competition. The proposal was to construct a reservoir with a capacity of 125,000 gallons, which would give a four days' full supply, and to carry a 6-inch main for a collecting well, on the present site to the reservoir, with an intercepting high-pressure reservoir. The quantity provided for was 45,000 gallons per day, or 15 gallons per head of the present population. At the inquiry, a petition against the scheme, signed by more than one-half of the ratepayers, was presented. The Local Government Board now say that provision should be made for a supply of not less than 20 gallons per head, and that the reservoir which was designed for four days' supply should have a capacity of 1,500,000 gallons, or 25 days' supply. They also object to other details of the scheme, including a tumbling bay, which they say appears to be unnecessary, and a high-pressure reservoir, for which they suggest the substitution of an ordinary reservoir of sufficient area. As to the source of supply, they point out that if possible the water should be obtained by driving tunnels into the greensand, instead of collecting it from the drains in the boggy ground. If this is not practicable as regards the Springfield source, they are of opinion that water from that district should not be used for drinking purposes. The reply of the Local Government Board was read at a meeting of the Town Council on Thursday; and it was decided to consider it in Committee. Attention will probably now be given to another scheme, which the opponents of the condemned plan allege is more advantageous.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

This week the Town Council of Dundee had before them a report by the Gas Committee to the effect that the smoke emitted from the retort-houses in the gas-works is not now so dense as it formerly was. Mr. Melville wanted to know if this was to be the end of the matter, and if nothing further was to be done. Complaint, he said, had been made to him to the effect that the smoke emitted from the chimneys during the past fortnight had been something tremendous. They ought, he considered, to get a report as to what was being done to do away with what was an unmitigated nuisance to residents north of Ferry Road. Mr. Ballingale said that three different schemes were on trial; and some time must elapse before they would be in a position to report. He could not understand how black smoke could be emitted from the chimneys, as coke was employed for stoking. There was certainly less smoke in the retort-houses than formerly, and as time went on it would be still further reduced. Mr. Longair thought it should be frankly admitted that a mistake had been made in regard to the height of the chimneys, the tops of which were not much higher than the roofs of the houses in Ferry Road. Bailie Robertson said it was not smoke but heavy dust which came from the retort-houses; and this caused the nuisance. The subject dropped without anything being done beyond the conversation referred to. Is it not strange that only in Dundee is this complained of? The Council were then asked by Mr. High, who never wearies of the subject, if there was to be any report about defaulting coal contractors. The matter involved about £2370; and he would like to see something done. A facetious member of the Council said the Committee would wait till Mr. High should forget. Mr. High said he had been quiet upon the matter, and had given them occasion

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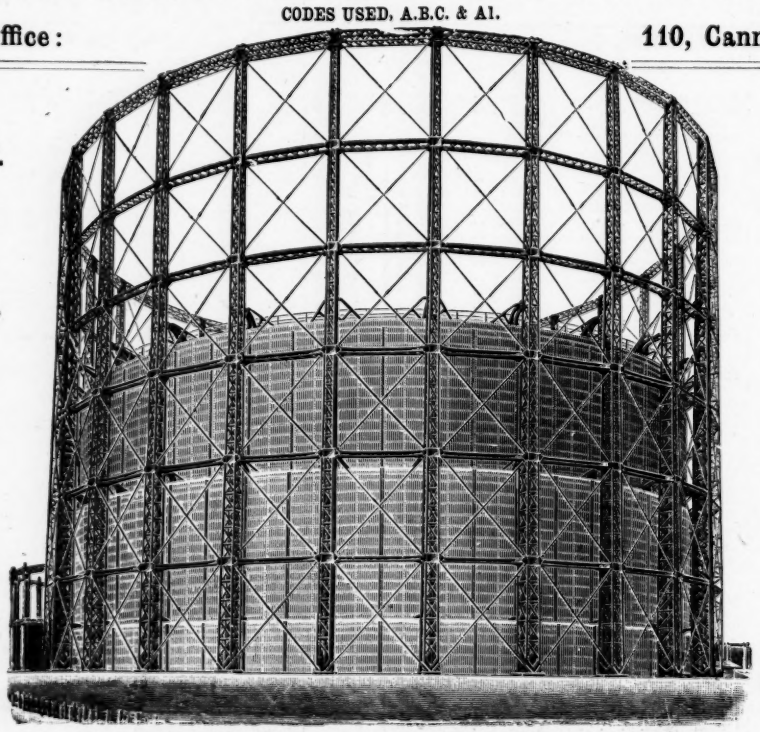

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SLIDE-VALVES, TAR-BURNERS, SIEVES.

to do right; but he complained that, after a motion was passed by the Town Council, to the effect that they were to have no dealings with defaulters, and that they should be struck off the list, the Committee had been dealing with defaulters all along. Lord Provost Hunter advised Mr. High to put his question at the next meeting of the Council; and he agreed to do so. Mr. Alex. Speed gave notice of a motion requesting a return as to the amounts which have been expended during the past two years in the Police and Gas Departments, how much had been placed to capital account, and how much treated as revenue.

Selecting, I suppose, the time when men begin to be discharged from gas-works, and when, in consequence, discontent is likely to be in the air, the Gas Workers and General Labourers' Union have become active in Dundee and Aberdeen. A meeting under the auspices of the Union was held in Dundee on Wednesday night, with Mr. W. Blackwood, of Glasgow, in the chair. Mr. Pickard, of London, who is the General Organizer, addressed the meeting upon the legal position of Trade Unions; giving instances of the conflicting opinions among judges and legislators upon the subject, to show the unsatisfactory nature of the present state of affairs. He urged the men to organize, and thereby obtain those conditions of labour to which they were entitled. The Aberdeen meeting was held on Thursday night. Mr. Blackwood said he was disappointed that the men had lost their case with the Town Council; but he attributed this result to their not being properly organized. The Executive Council had given them a mandate that they would provide the sinews of war, if necessary, to fight the Town Council, in the event of the men's requests being refused. The men's petition was refused; and he was sorry that they had not the courage to stand out for their rights. If the gas workers left the Union, they would never obtain time-and-a-quarter for Sunday labour, and neither would they get Sunday labour abolished. It was a notable fact that the gas workers in Aberdeen were the lowest paid and the hardest worked of any in Scotland, They would learn, however, in course of time, that it was only through united action that they could get their wages raised; and that when the time came for a struggle, every man who stood by the Union would be supported by that organization. The Union, however, were not to stop where they were; they were to persevere until every member had 28s. per week. They were also determined that each man in the employment of the Corporation should be a member of the Union. Mr. H. H. Duncan thought that if they could not defeat Mr. Kemp, the Convener of the Gas Committee, in the Council, they surely could do it in Rosemount Ward. Instead of allowing their branch of their Union to dwindle away, the men ought to take a lesson from the skilled labourers, and combine more and more determinedly. Mr. W. Proctor regretted that the men had lost heart after getting the "dirty kick" from Mr. Kemp. The working men of Aberdeen had had enough of him. He would like them to look Mr. Kemp in the face, and let him know that they were prepared to fight him. Mr. Pritchard said that Mr. Kemp, after he had refused the petition of the gas workers, went to another board and voted for an increase of £200 to the Harbour Engineer. He went in for raising the salaries of the higher paid officials, but he would do nothing for the poor workers. A resolution in support of the Union was submitted and unanimously agreed to; and at the close of the meeting, it is reported, a good many intimated their readiness to become members. The speaking at Aberdeen was the boldest I have ever heard of in times of peace. It is evident that the leaders of the Union feel sore at their discomfiture, and are trying to cover their retreat by loud and blustering remarks.

In a report to the Dumfries Town Council, Mr. G. Malam, the Gas Manager, states that during the past four years the quantity of gas produced has increased by 17½ million cubic feet, and the total is more than double what it was when the last holder was erected. He estimates that during the present year the output of gas will amount to 90 million cubic feet. The capacity of the existing gasholders is only about 250,000 cubic feet. He recommends the construction of a new holder, of 500,000 cubic feet capacity, at a cost of about £8000. Mr. Malam suggests other extensions to the works and plant, at a further cost of £7000. The report has been considered by the Gas Committee this week, and they have resolved to delay the subject, in view of the movement towards the electric lighting—a poor reason, and a foolish one.

Last night the employees in the Dawsholm and Dalmarnock gas-works of the Glasgow Corporation held their annual social meetings—the former at Maryhill, and the latter at Bridgeton. Lord Provost Chisholm presided at the Bridgeton meeting, and gave an address of the complimentary and appreciative order for which he is famous. He has not his equal among the Provosts of Scotland in the matter of saying something which is interesting and appropriate to the occasion. He extolled the occupation of gas making as one of the most important in the city, and one on which the prosperity and comfort of the citizens depended to a very large extent. Without their work, the city would be in darkness, and many industries which depended upon engines operated by gas would be brought to a stop. It was a grand thing for a man to be able to say to himself that the work in which he was engaged was one that was doing great good all round. Councillor Webster presided at the gathering in Maryhill. He stated that the output of gas during 1901 from the Dawsholm and Temple works was 2898 million cubic feet; that the wages paid amounted to £321,862; and that the number of men employed was 1051.

The Corporation of Broughty Ferry have let the contract for the erection of a retort-house in their gas-works to Mr. Carnegie, of Dundee, at the price of £1244. They had accepted the lowest offer of £1172 by Mr. James Scott; but Mr. Scott withdrew his tender, and Mr. Carnegie was substituted for him.

In his report for the past year, the Medical Officer for the burgh of Motherwell states that the only offensive trade in the burgh is the manufacture of ammonium sulphate at the gas-works; but he is considerate enough to add that it is only a nuisance at intervals. The gentleman must be possessed of a fine optimism if he only finds one nuisance in Motherwell, and that only at intervals, because, to outsiders, the whole district is full of factories which are undesirable neighbours. Why he should select the gas-works as the only objectionable place in the town, passes my comprehension.

WELSBACH

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Giving a Lighting Efficiency of 300 CANDLES PER BURNER with about 10 Cubic Feet of Gas

AT ORDINARY PRESSURE.

Dispensing entirely with Auxiliary Compressing Plant of any kind whatever.

Specially Suitable for Lighting Large Areas.

The most Economical and Efficient System on the Market.

The Welsbach Shadowless Lantern, with Self-Intensifying Welsbach-Kern Burner.

FOR FURTHER PARTICULARS APPLY TO THE

WELSBACH INCANDESCENT GAS-LIGHT CO., Limited,

PUBLIC LIGHTING DEPARTMENT, YORK STREET, WESTMINSTER, LONDON, S.W.

An arbitration to determine the price to be paid by the Airdrie and Coatbridge Water Trustees (created by Act of Parliament in 1900) for the undertaking of the Airdrie and Coatbridge Water Company, has been proceeding at Westminster this week. The Company have introduced an excellent supply of water from a district as far away as the vicinity of Biggar; and it was when the price of water was about to be raised, in consequence of the large new capital outlay, that the desirability of obtaining a transfer of the undertaking became evident. The Company claim £502,758, of which £442,711 represents the undertaking itself, and £60,000 lands, plant, materials on hand, cash, unpaid back-dividends, investments, and compensation to servants. The price works out at 36½ years' purchase. For the Trustees, it is maintained that not more than 28 years' purchase should be allowed; and they dispute the claim for the payment of back-dividends as not being authorized by either local or general statutes.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 8.

Sulphate of Ammonia.

There has been no cessation in demand, but supply has been about sufficient to meet it, so that there has been no important improvement in values at any point. The closing quotations are £11 7s. 6d. per ton, f.o.b. Hull, and £11 10s. per ton f.o.b. Liverpool and Leith. Demand for covering purposes is well sustained, but purchasing has been fairly shared by direct buyers. There has also been good inquiry for March delivery; but the premium of 2s. 6d. per ton required has rather deterred buyers. In the forward position, makers are firm at £11 10s. per ton, ordinary terms, f.o.b. Leith; but this price has not so far been reported paid—buyers being rather shy of the later spring months. London, Beckton terms, is also held for £11 10s. per ton.

Nitrate of Soda.

This is again firmer, the decrease of 25,000 tons in the January shipments, as compared with January, 1901, having materially strengthened the situation; an increase of some 50,000 tons having been anticipated a month ago. The spot price has been advanced to 10s. 4½d. per cwt.

LONDON, *Feb.* 8.

Tar Products.

There is very little of interest to report; business being decidedly dull. Pitch continues very strong; and a large business is now being done over July-December, while contracts have been made for September-March at fairly good prices. Great scarcity still prevails in London; it being impossible to get any offers for prompt delivery. 90 per cent. benzol is easier. Business is reported at an outport at 9½d., February-March, for export; but nothing fresh has transpired upon the London market. Makers still ask 10¼d., although 10d. is the outside value. 50-90 per cent. remains in the same depressed state. There are really no buyers at present at over 8d. Creosote is decidedly quiet; and, if anything, prices are easier all round, especially in the North. Carbolic crystals are still very quiet, and there is no business to report; the price of 39-40's being purely nominal. There is a little business doing in 34-35's at 6½d. for early shipment from London. Crude is offering freely at 1s. 10d. at outports; but consumers are not anxious to contract even at this price. Tar continues firm all round; but no contract of any importance has recently been let.

The average values obtaining during the week are: Tar, 16s. Pitch, east coast, 37s. to 38s.; London, 39s.; west coast, 34s. 6d. to 35s. Benzol, 90's, 9½d. to 10d.; 50's, 8¼d. to 8½d. Toluol, 9d. to 10d. Crude naphtha, 3⅞d. to 4d. Solvent naphtha, 10½d. to 11d. Heavy naphtha, 10d. Creosote, London, 1⅝d. to 1¾d.; North, 1 1/16d. to 1⅛d. Heavy oils, 2d. to 2⅛d. Carbolic acid, 60's, 1s. 10d. Naphthalene, 50s. to 70s.; salts, 22s. 6d. to 27s. 6d. Anthracene, "A," 40-45 per cent., 2d.; "B," 1d.

Sulphate of Ammonia.

The market continues firm; and the position is unchanged. Beckton are still sellers at £11 10s., February-June, but do not find much business doing at this price. In Hull, several parcels have been sold at from £11 7s. 6d. to £11 8s. 9d.; but these prices were for very good makes. £11 8s. 9d. to £11 10s. may be taken as the market value for February-June. In Leith, further business is reported at £11 8s. 9d.; and makers now ask £11 10s. in any position. As regards Liverpool, there is a very good demand, especially for early delivery; and prices are strong at this port.

COAL TRADE REPORTS.

Lancashire Coal Trade.

A steady position, as regards both prices and demand, is maintained in the coal trade of this district. The better qualities of round coal are still moving away pretty freely for house-fire consumption; and although supplies are ample to meet requirements, collieries are disposing of all they are raising, with prices firm at recent quotations. These average 15s. to 15s. 6d. per ton at the pit for best Wigan Arley, 13s. to 13s. 6d. for Pemberton four-feet and seconds Arley, and 11s. to 11s. 6d. for common house coal. There is no change in the situation as regards the lower qualities suitable for iron-making, steam, and general manufacturing purposes. Although the demand is not more than moderate, there are no surplus supplies of any amount coming on the market, owing to the continued extra demand for common house-fire purposes; and 9s. per ton remains about an average figure for good ordinary qualities of steam and forge coals. Some slight improvement, if anything, is noticeable in the engine fuel trade. Certainly, there is not the same pressure of surplus supplies on the market; and the better descriptions are all meeting with a ready sale, with prices firm on the basis of about 7s. per ton at the pit. For inferior qualities,

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"KING
EDWARD."

BURNER
and
BRICK
readily
removable
from
front
by new
HINGED
DOOR.

prices remain low, owing to surplus output still coming in from Derbyshire at competing figures; and from 5s. to 5s. 6d. per ton at the pit would represent about an average for common Lancashire slack. A moderately active demand is kept up for shipment; and from 10s. 6d. to 11s. per ton is being obtained for good qualities of steam coal, delivered at the ports on the Mersey. In the coke trade, prices are steady, and Lancashire makers, at a meeting held last week (when very satisfactory reports were received as to the demand generally), decided to maintain the present list basis rates at 22s. to 24s. per ton for best foundry, and 13s. to 14s. for best washed furnace cokes, at the ovens.

Northern Coal Trade.

The coal trade is quieter, and there is a range of prices that is generally lower than that of the past week. The cause seems to be more a contraction of the demand in several parts than any special falling off. There is at this time of the year usually a rather limited shipment, because the Northern ports which take so large a part of the coal from this district are closed, and there is a lessened consumption in the manufacturing trades. Best Northumbrian steam coals are quiet at from 10s. to 11s. per ton f.o.b.; and the steam small trade is less than it was—about 5s. per ton being the current price. Gas coals have naturally been influenced in sympathy with other qualities, though the demand is still good, and the chief collieries producing best Durham gas coals have been well employed. Prices are easier, though irregularly so; and quotations are more difficult because of the varied position of different pits—those having full contracts naturally asking higher prices than others not so well situated. But with this qualification, good Durham gas coals may be said to be from 10s. to 10s. 6d. per ton f.o.b., though both higher and lower prices are spoken of as possible. Some negotiation is taking place as to forward contracts; but little seems settled—buyers inclining to hold off. Coke is quieter, and prices of some qualities are lower. Best Durham coke is 17s. 6d. per ton f.o b.; for blast-furnace coke, 16s. at the Teesside furnaces is asked. Gas coke is almost identical in position with that of last week.

Scotch Coal Trade.

There is little variation in trade. What there is points to easier prices, particularly for splint. The quotations, are: Main 9s. to 9s. 3d. per ton f.o.b. Glasgow, ell 10s. 3d. to 11s., and splint 10s. 6d. to 10s. 9d. The shipments for the week amounted to 176,920 tons—a decrease of 8343 tons upon the previous week, but an increase of 54,402 tons upon the corresponding week of last year. For the year to date, the total shipments have been 878,171 tons—an increase of 168,646 tons upon the same period of last year.

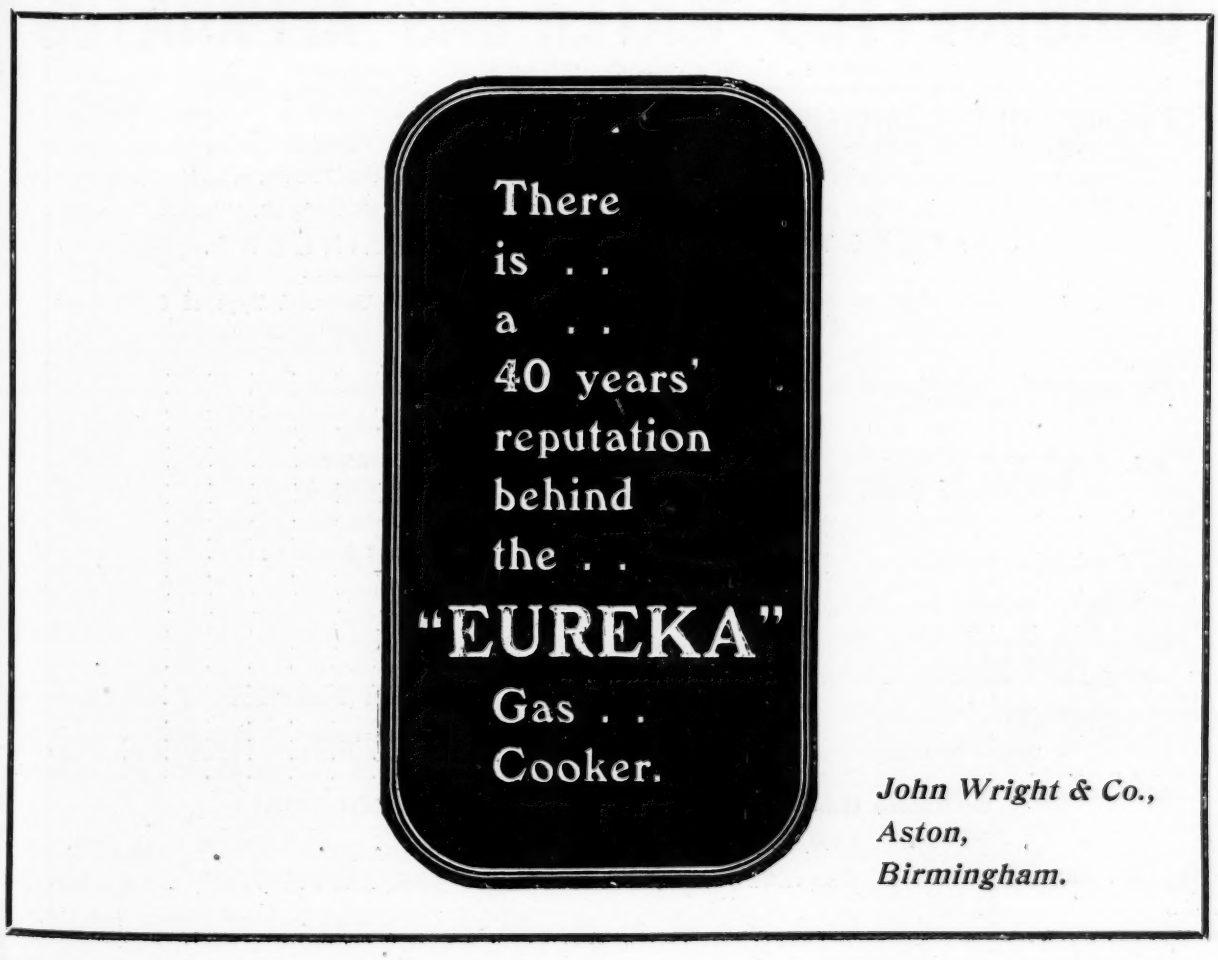
One of the Auditors of the Local Government Board has lately disallowed some expenses incurred by the pupils of the Town Clerk of Leeds in connection with the business of the Corporation, on the ground that they were not servants of the Corporation. It was contended, in justification of the items, that the pupils were as much entitled to their expenses as any other clerks in the establishment.

New Joint-Stock Companies.—The International Incandescent Light Company, Limited, has been registered with a capital of £1000, in £1 shares, to carry on the business of dealers in, makers, and merchants of all kinds of accessories for incandescent light, and to acquire the property of any persons carrying on a similar business. Under the title of Brotherton and Co., Limited, a Company has been registered with a capital of £250,000, to acquire the business of ammonia and tar distillers, &c., now carried on by Mr. E. A. Brotherton at Leeds, Wakefield, Birmingham, and elsewhere, under the style of Brotherton and Co.

The Repayment of Loans for Land Purchase.—The Local Government Board have, according to the "Local Government Journal," made an important concession in regard to the period allowed for the repayment of loans. The Public Health Act of 1875, and most other Public Acts under which local authorities borrow money, provide that loans shall be repaid within such period not exceeding 60 years as the Local Government Board may determine. The Board have, however, always adopted a maximum term of 50 years, and have only granted this term in the case of purchases of land. This rule is to be relaxed in future; the Board having notified that they are willing to allow the full period of 60 years in the case of all loans for land purchase.

Profitable Sale of Water-Works.—The Bury Corporation last Thursday approved a scheme for spending £100,563 due to them by the transferring of their water-works undertaking to the Bury and District Joint Water Board, comprising eight Local Authorities. A sum of £94,188 is being used to extinguish mortgages and stock outstanding upon several municipal undertakings, and the balance is invested with the Board. The amount of the debt extinguished will not be actually repaid to the bondholders, but will be transferred to, and considered as borrowed upon, new undertakings as follows: Abattoirs, £27,000; sewerage, £59,896; town's yard siding, £4000. This will avoid the necessity of obtaining loans for these new works at the present comparatively high rates of interest. A further £48,000 will come to the Corporation from the same source; but it is not due until the Board's water undertaking yields surplus revenue.

Teignmouth Gas Undertaking.—Mr. J. A. Gray, the Manager of the Teignmouth Gas-Works, had the satisfaction of presenting to the District Council on Tuesday last a statement showing that the working of the undertaking during the past quarter has resulted in a profit of £293. As profit has hitherto been seldom mentioned in connection with the undertaking, this report was received as a good augury; and several of the members suggested that the earliest opportunity should be taken to reduce the price of gas. The Rev. A. Cartwright thought that the first step should be a reduction of the outstanding liabilities; while Mr. Slocombe reminded the Council that an addition of £200 a year was made some time ago to the charge for public lighting, and he suggested that this should be lowered. He pointed out that they could not anticipate a similar profit every quarter, though they might, he thought, now expect a gain of £600 a year. Mr. Harris said the statement of the Manager indicated considerable improvement in the position of the works, and was a reason for beginning to reduce the price of gas, which was very high.



Gas-Burners for Reduced Illuminating Power.—At the meeting of the London County Council last Tuesday, the Public Control Committee reported that the South Metropolitan Gas Company had agreed to supply their consumers with governed burners, upon application, at a charge of 2d. (instead of 6d.) each.

Gas v. Electricity in the Midlands.—Messrs. Archibald Kenrick and Sons, of Smethwick, who have one of the largest works in the Midlands, after using electricity for lighting their premises for the past few years, have decided to discard this system altogether, and have given instructions to the Gas Committee of the Smethwick Corporation to again supply them with gas for lighting purposes. We learn that Tangyes, Limited, are making some interesting experiments in lighting their works.

Proposed Extension of the Stockton Gas-Works.—At last week's meeting of the Stockton Corporation, the Gas Committee recommended that the Manager (Mr. W. Ford) should prepare plans and estimates of such additions as he thought should be made to the gas-works. Mr. Meggeson asked what was the maximum producing power of the works; but the Mayor (Alderman J. Richardson, J.P.) ruled him out of order. Mr. Meggeson thereupon challenged the Mayor to take counsel's opinion upon his right to have the information, and said he would pay for it if he were in the wrong. The Mayor: You do not want counsel's opinion; you want councillor's opinion—that is, your own. Mr. Meggeson then moved that the recommendation of the Committee be referred back, and that in place of it Mr. Ford be asked to tell them exactly at the next meeting of the Gas Committee what was the producing power of the works. Alderman Bainbridge seconded the amendment, which Mr. Meggeson, however, later on withdrew; and the recommendation of the Committee was carried.

Leeds Gas-Works Extensions.—Mr. E. P. Burd, of the Local Government Board, held an inquiry last Wednesday, relative to an application by the Leeds Corporation for a Provisional Order under section 303 of the Public Health Act, 1875. Among other things, powers are sought to partially repeal, alter, or amend certain Local Acts in force in the city, so as to enable the Corporation (*a*) to purchase, acquire by agreement, and hold for gas-works purposes, in addition to the area of land which they may now purchase, acquire, and hold, a further area of 20 acres; and (*b*) to use for the manufacture and storage of gas or residual products certain lands in the township of Hunslet, containing 6293 square yards. In laying the case before the Inspector, the Town Clerk (Mr. W. J. Jeeves) quoted some interesting figures. The wonder, he said, was not that the Corporation should now be making this application, but that they should not have made it long ago. In 1868, the number of gas consumers was 57,330, and the consumption 674 million cubic feet; while last year the consumers numbered 97,363, and the consumption of gas amounted to 2790 million cubic feet. In view of probable further extensions, 20 acres would not be too large an area to acquire. The cost would come out of the £300,000 which had already been sanctioned for gas purposes. The proceedings were purely formal, and there was no opposition.

Reduction of Water Charges at Halifax.—The Halifax Water-Works Committee have decided that, on and after April 1 next, the use of all meters for gas-engines up to and including 10-horse power shall be discontinued, and that the charges for the supply of water to gas-engines shall be as follows: From ¼ to 1 horse power, 2s. 6d. per annum (in addition to workshop and other charges); from 1 to 10 horse power, 2s. 6d. per horse power; for gas-engines over 10-horse power, and other purposes, the supply is to be by meter—the minimum water charges for all purposes to be £1 5s. per annum, *plus* meter-rent. These charges, it is stated, go a long way towards meeting the requirements of the users of gas-engines, who previously met to discuss the question.

Fatal Explosions in Chicago.—We learn from a Reuter's telegram sent from New York on the 6th inst., that explosions of gas which occurred on the previous night in Chicago killed thirteen persons, injured many others, and wrecked two buildings. The cause of the explosions—whether due to illuminating or sewer gas—was not known. The first took place at Twenty-second Street and Archer Avenue, and the second half-a-block distant. Flames poured out of a manhole, and several other manholes were blown out. The flames of the first explosion caught a wooden building near, which collapsed, and its occupants were carried down to the basement.

Exhibition Lighting by Lucas Lamps.—The Manager of the Brierley Hill Gas Company (Mr. W. C. Jones) contributed very largely to the success which attended the recent annual exhibition of the local Camera Club by his excellent lighting of the Town Hall on the occasion. He had six Lucas burners temporarily fixed up, which, in the language of the report of the proceedings, "flooded the hall with a light quite as agreeable as, and of more penetrative power than, electricity." The approximate illuminating power of the 70 old burners by which the hall is usually lit is 1000 candles, consuming 336 cubic feet of gas per hour; while the six Lucas lights had an approximate power of 4500 candles, and a consumption of 132 cubic feet of gas per hour. We learn that the excellence of the light was a theme of general remark. Mr. Jones took two photographs of the interior of the hall by the light, and the prints have come out with remarkable clearness.

Codnor Gas Supply.—Last Wednesday evening, a deputation of the Directors of the Ripley Gas Company waited on the Heanor District Council in reference to the supply of gas to Codnor and Loscoe, in respect of which complaints had been made. The Chairman of the Company (Mr. J. Whitcombe) stated that some of the complaints were without foundation. It was asserted that the Parish Church had been in darkness, and other places of worship inconvenienced. Their explanation was that an accident occurred—a steam-roller crushing the mains and letting in water. As soon as the Directors heard of the inadequate supply, they had made arrangements to put down new mains. The Council eventually passed the following resolution: "That, having heard the statements of the Ripley Gas Company's deputation, the Council see no reason whatever to depart from their previous resolution, to the effect that the Council would support the Langley Mill Gas Company in obtaining powers to take gas to Condor."

CARBURETTED WATER-GAS APPARATUS

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	Cubic Feet Daily.		Cubic Feet Daily.
BLACKBURN	1,250,000	WINNIPEG, MAN.	500,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	COLCHESTER (Second Contract)	300,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	YORK	750,000
COLCHESTER	300,000	ROCHESTER	500,000
BIRKENHEAD	2,250,000	KINGSTON, ONT.	300,000
SWINDON (New Swindon Gas Co.)	120,000	CRYSTAL PALACE DISTRICT	2,000,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	DULUTH, MINN.	300,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	CATERHAM	150,000
HALIFAX	1,000,000	LEICESTER	2,000,000
TORONTO	250,000	ENSCHEDE (HOLLAND)	150,000
OTTAWA	250,000	BUENOS AYRES (RIVER PLATE CO.)	700,000
LINDSAY (Remodelled)	125,000	BURNLEY	1,500,000
MONTREAL	500,000	KINGSTON-ON-THAMES	1,750,000
TORONTO (Second Contract; Remodelled)	2,000,000	ACCRINGTON	500,000
BELLEVILLE	250,000	TONBRIDGE	300,000
OTTAWA (Second Contract)	250,000	STRETFORD	500,000
BRANTFORD (Remodelled)	200,000	OLDBURY	300,000
ST. CATHERINES (Remodelled)	250,000	TODMORDEN	500,000
KINGSTON, PA.	125,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
PETERBOROUGH, ONT.	250,000	YORK (Second Contract)	750,000
WILKESBARRE, PA.	750,000	ROCHESTER (Second Contract)	500,000
ST. CATHERINES (Second Contract)	250,000	NEWPORT (MON.)	250,000
BUFFALO, N.Y.	2,000,000	TOKIO, JAPAN	1,000,000

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

LEEDS . . . 1,800,000 Cubic Feet. SMETHWICK . . . 500,000 Cubic Feet.

MALTON, 150,000 Cub. Ft. . GRAVESEND, 300,000 Cub. Ft. . PERNAMBUCO (Brazil), 125,000 Cub. Ft.

Sales of Shares.—On Tuesday last, Messrs. Penney and Clark sold by auction at Southsea as many £5 shares in the Portsmouth Water Company as would realize £9366, which would complete the issue of new capital authorized. The prices realized ranged between £6 7s. 6d. and £7 per share. Several £50 shares in the Marlborough (Wilts) Gas Company, on which a dividend of 5 per cent. per annum is paid, have lately been sold by auction for £122 each.

Reductions in Price.—The Calverley and Horsforth District Gas Company have reduced the price of gas from 3s. to 2s. 9d. per 1000 cubic feet. The Newcastle and Gateshead Gas Company have decided to lower the price of gas by 1d. per 1000 cubic feet. The Southampton Gas Company give notice that the price of gas to ordinary consumers will be reduced by 2d. per 1000 cubic feet throughout the whole of the Company's districts, after the taking of the meters at the March quarter.

Fatality at the West Ham Gas-Works.—An inquest was held a short time ago on the body of Thomas Banks, a coal porter at the West Ham Gas-Works. It appeared that deceased, when adjusting a coal-grab, fell into it; and the crane-driver pulling up at the same moment, the grab closed on the unfortunate man, who died the same night. The Jury returned a verdict of "Accidental death," and expressed the opinion that a permanent responsible employee of the Gas Company should in the future superintend such work.

A Link with the Past.—A discovery which forms an interesting link with olden times has been made at Handsworth. Some workmen in the employ of the Birmingham Corporation Gas Department were excavating for the purpose of making a connection for a gas-engine placed at the rear of the old hostelry known as the Pump Tavern in Soho Road at Handsworth. Underneath the footpath, they came across an ancient well, from which the house evidently derived its name. An old resident remembers distinctly half-a-century ago an old wooden pump standing there. The streets were not illuminated with gas in those days, and the pump was surmounted by an oil-lamp, from which smokers were in the habit of lighting their pipes.

Kingsbridge Water Supply.—It was decided by the Kingsbridge District Council on Thursday to take the necessary steps to carry out a scheme of water supply for West Alvington. A Committee who had had the matter under consideration, reported that they had concluded arrangements with the landowner on the basis of a lease for 500 years at a rental of £45 per annum; and they recommended that the necessary plans and specifications be prepared, and application made for power to borrow the money. The Chairman (Mr. J. S. Hurrell) said that the work could be carried out for £2500. If it is approved by the Local Government Board, this scheme will be in substitution for the plan for which the District Council obtained a Provisional Order last year, the estimated cost of which was £10,000.

Bristol Water Bill.—An extraordinary meeting of the Bristol Water-Works Company was held last Saturday week for the purpose of considering the Bill now before Parliament. The Chairman (Mr. C. Bush) explained that the Bill—which was for the construction of works and the acquisition of land in the county of Somerset, as well as for the creation of new capital—was principally a distributing one. They had a fine water supply at Blagdon; and they wanted to get it into Bristol, and so distribute it. The Directors had unanimously agreed that now was a favourable time to obtain the Bill. They knew they were going to be opposed by the Corporation; but the Directors would ask them to put their faith in the Board. What was proposed would be best for the city, and for themselves. He moved the adoption of the Bill proposed. Mr. H. N. Abbot, who seconded the motion, asked the shareholders, in the face of the opposition threatened by the Corporation, to have confidence in the Board, and not to provoke a discussion which would be inopportune. In reply to a question as to the grounds of opposition, Mr. Abbot said he could not answer the inquiry then; but they knew that the Corporation seized every opportunity of opposing, whether there were grounds or not. The Corporation were habitually hostile to them, and would use every stick they could to beat them. The resolution was carried.

The order for the scrubber-washer for the Chorley Corporation, recently advertised, has been placed with Messrs. W. C. Holmes and Co., of Huddersfield.

The Cardiff Gas Company have placed an order with Messrs. Kirkham, Hulett, and Chandler for two of their patent "Standard" washer-scrubbers, each for 3 million cubic feet of gas per day.

We learn that the Neath Rural District Council have purchased the Cwmavon Gas and Water Works, which are owned by Messrs. Wright, Butler, and Co., Limited, for £1500. The concern was started in 1885.

The total cost of the Stockport Corporation Water Act of last year was £8736, of which rather more than half went in payment for legal, engineering, and other expert assistance. The fees in the two Houses came to £420.

As already announced in our advertisement columns, the Sunderland and South Shields Water Company are about to issue £20,000 of new 5 per cent. stock, which Mr. Atkinson Gibson will offer for sale on the 20th inst.

Last Saturday week, Mr. S. E. Halliwell, the Manager of the Littleborough Gas-Works, delivered an interesting lecture on the "History and Manufacture of Coal Gas" before the local Wesley Guild. The lecture was illustrated by limelight views.

Messrs. R. Dempster and Sons, Limited, of Elland, have received an order from the Malvern Urban District Council for coke-screening plant, with storage hoppers, overhead gantries, &c., for loading coke into railway waggons, carts, &c., and stacking coke in the yard.

It is stated that rapid progress is being made with the scheme for a new supply of water to Otley, from a reservoir to be constructed at March Ghyll, near Ilkley. The Contractors have already got a large amount of plant on to the works; and it is expected that a start of the reservoir construction will be made this month. The contract for the supply of mains has been let to the Stanton Iron Company, at £4 14s. 9d. per ton for straights, and £10 for specials.

It is announced that the Gas Strip Association have reduced prices 2s. 6d. per ton, owing to severe competition; German strip having for some time been imported into the Midlands below Staffordshire quotations. The new basis of £6 10s., however, is only nominal; strip being freely offered at 2s. 6d. less. The action of the Association was subsequently adversely criticized on the Birmingham Exchange, when it became known, through local representatives of German houses, that German strip had been advanced 5s., or about 2s. per ton above previous Staffordshire quotations, and English orders have been refused at late rates.

The gas engineering works of Messrs. Clayton, Son, and Co., Limited, are fully employed. The firm are at present constructing gasholders for Bolton, Ely, Stratford, and Bridlington; and they have in hand an order for a holder and tank for the Dewsbury Road gas-works, Leeds. They are also employed in roofing the retort-house at the East Greenwich station of the South Metropolitan Gas Company, and in building the roof of a purifying-house for the Manchester Corporation Gas Department. In their boiler department, Messrs. Clayton are making boilers for electricity generating stations at Leeds, Batley, and Hull, in addition to numerous ones for factory engines. An extensive contract has also been placed with them for the erection of a Mond gas plant at Gijon, in Northern Spain.

At the last meeting of the Tipton District Council, the Gas Committee reported that the Manager's estimate for four new purifiers, elevators, conveyor, &c., amounted to £4170; and they recommended the acceptance of the Horseley Company's tender for the sum of £2990 (exclusive of royalty for Milbourne's patents). If, on inquiry, the royalty is considered reasonable, the amount is to be added to the tender and the patents used. In the event of the royalty being excessive, they recommended that the Horseley Company's alternative scheme be adopted at a cost of £3056. They also recommended the acceptance of the tender of Messrs. R. & J. Dempster of £2500 for a water-gas plant, and of Messrs. Cochrane and Co. for a new main for Ocker Hill. The recommendations were adopted.

We have received from Messrs. Evered and Co., of Drury Lane, their new catalogue (No. 19) of gas-fittings for the current year. It consists of 295 quarto pages of well-executed illustrations of fittings of all kinds, in finished brass, hammered iron, and copper. The designs are very artistic, and such as to suit all tastes. The firm have brought the catalogue quite up to date by devoting several pages to acetylene gas-fittings; this system of lighting now coming into use for isolated country houses and other places where a supply of ordinary gas is not available. The concluding pages of the book contain illustrations of small brass fittings or joints, wood gas-blocks, &c. Altogether, the volume is a highly creditable piece of work for a trade catalogue, and reflects a great deal of credit upon all who have been responsible for its production.

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State Quantity to offer for Prompt and Forward Delivery.

The SHARPNESS CHEMICAL COMPANY, Tar Distillers, Sharpness Docks, GLOS.

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CONTRACTS are undertaken by William EDGAR for FITTING UP HOUSES complete with the PENNY-IN-THE-SLOT INSTALLATIONS. Gas Companies or Corporations indemnified against loss through Accidents, &c. Thousands of Houses have been fitted up by me under this System. Estimates free.
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Telephone No. 14, Hammersmith.

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HIGHEST-CLASS Cycles.—"Humbers,"

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Write precise Requirements to MANAGER, Imperial Cycle Supply Company, COVENTRY.

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Address "CHEMIST," care of G. W. Byrne, Esq., Solicitor, 14, Bell Yard, TEMPLE BAR, W.C.

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VALVES inside your Purifiers, you can relieve the Back-Pressure in the Lower Tiers when the Purifying Material gets hard. They are extremely useful and economical.

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Apply, with Testimonials, to S. J. ACLAND, Engineer and Secretary, Gas-Works, Blaina, MON.

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Apply, by letter, stating Experience and Age, with recent Testimonials, to No. 3807, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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For printed Particulars of Duties apply to the undersigned.

Applications, marked on the outside "Application for Gas Managership," must be sent to the Town Clerk of Ripon, or delivered at his Offices on or before Tuesday, the 18th inst.

Canvassing the Council will disqualify.

By order,
M. KIRKLEY,
Town Clerk.

Town Hall, Ripon,
Feb. 3, 1902.

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WANTED, a First-Class Foreman

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Applicants must be capable of taking full control of Fitters, Turners, Blacksmiths, with their Labourers and Pipe Erectors numbering about 30 men. A thorough practical knowledge of the construction and working of all classes of Machinery connected with a large Gas-Works is necessary.

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NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.

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Offers for whole or part will be received by the undersigned.

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GASHOLDER (and Cast-Iron Tank), 17,500 cubic feet capacity.
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Tenders to be sent in, together with a general Specification and Drawing, showing Section of Socket and Spigot, and giving Weight and Length per pipe, on or before Monday, the 3rd of March next.

BUXTON URBAN DISTRICT COUNCIL

(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for

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Particulars and Forms of Tender can be obtained on application to Mr. H. Barker, Gas Engineer, Town Hall, Buxton.

Sealed Tenders, endorsed "Retorts," to be sent to the undersigned, so as to reach him not later than Saturday, the 22nd inst.

The Gas Committee do not bind themselves to accept the lowest or any Tender,

(Signed) JOSIAH TAYLOR,
Clerk.

Town Hall, Buxton.